[No. 32]

JOURNAL

OF THE

STRAITS BRANCH

OF THE

Royal Asiatic Society.

JUNE 1899.

Agents of the Society.

London and America ... ... TRUBNER & Co.
Paris ... ... ERNEST LEROUX & CIE.
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PROCEEDINGS

OF THE

ANNUAL GENERAL MEETING,

OF THE

STRAITS BRANCH

ROYAL ASIATIC SOCIETY,

HELD AT THE

RAFFLES MUSEUM, SINGAPORE.

ON

20th JANUARY 1899.

———:———

PRESENT:

H. E. SIR C. B. MITCHELL, *Patron*, Hon'ble W. R. COLLYER, *Vice President*, SIR A. SWETTENHAM, Messrs. BLAND, KNIGHT, NANSON, H. VAN PAPENDRECHT, DE VICQ, ST. CLAIR, Rev. W. G. SHELLABEAR, Dr. LUERING, Dr. HANITSCH, *Treasurer*, H. N. RIDLEY, *Secretary*.

The Minutes of the last general meeting were read and confirmed.

The Officers for the ensuing year were elected, *viz* :—

President.—Right Rev. BISHOP HOSE.

Vice President (*Singapore*),—Hon'ble W. R. COLLYER.

" *Penang*,—Hon'ble J. K. BIRCH.

Secretary.—H. N. RIDLEY, Esq.

Treasurer.—Dr. HANITSCH.

Council.—Mr. R. W. BLAND, Mr. A. KNIGHT, M. DE VICQ, Mr. W. G. ST. CLAIR, Rev. W. G. SHELLABEAR.

The Members elected by the Council during the previous year were formally elected.

The New Map was exhibited, and complementary copies were voted for Prince Dewawongse, for his assistance in the matter of Siamese territory, and for H. H. the Sultan of Johore for the use of the Map of Johore.

Annual Report of the Council for 1898.

———:———

The Council are happy to state that the financial position of the Society is in a very satisfactory state, and that, though there have been fewer members added to the Society than last year, the number of members keeps up to the average.

The members added were Mr. J. Driver, Mr A. L. Butler, Mr. J. Mason, Mr. J. E. Banks and Mr. J. B. Wood.

The Council have to regret the loss by death of Mr. A. H. Everett, who had been a member of the Society for eighteen years.

The proofs of the New Map were received in August, and were revised and returned by the Map Committee the same month. Steps have also been taken to copyright it. Copies for distribution are expected very shortly. The Government of the Straits Settlements renewed the vote of 1,000 dollars for aid in its publication.

One Journal (No. 31) was published, which contained a complete index of all papers published in the Journal since its commencement Another is now in the Press and will be shortly in the hands of the Subscribers.

The Council are glad to see an increase in the number of Contributors to the Journal, and hope that this may be still more augmented.

A large number of pamphlets, books, and journals of kindred Societies have been received in exchange for copies of our own Journal and have been added to the library. A large number of books have been bound.

A Statement of Accounts by the Treasurer is appended.

Honorary Treasurer's Cash Account, for the Year ending 31st December, 1898

Dr. *Cr.*

1898		$	c.	1898		$	c.
	To Balance in Chartered Bank	342	43		By American Mission Press for publication of Journal No. 31 ...	436	29
	Do. Mercantile Bank ...	278	61		„ Advertisement ...	4	20
	„ With Hon Treasurer (Mr. Anthonisz) ...	11	35		„ Commission to Collector	10	00
	„ Subscriptions for 1896 ...	30	00		„ Book-binder ...	29	30
	„ Do. 1897 ...	80	00		„ Clerk's Salary, (including December 1897,...	65	00
	„ Do. 1898 ..	370	00		„ Clerk's Petty Expenses	9	97
	„ Do. 1899 ...	20	00		„ Postages on letters and Journals ...	25	98
	„ Life Member ...	50	00		„ J. van Cuylenberg for preparing New Map	700	00
	„ Sale of Journals ...	687	09		„ Telegram to England ...	20	25
	„ Government Grant towards the New Map ...	1000	00		„ Balance in Chartered Bank ...	1337	50
	„ Interest on Cash Balance Chartered Bank ...	5	07		„ „ Mercantile Bank ...	249	76
	„ Do. Mercantile Bank	13	70				
		$ 2,888	25			$ 2,888	25

R. HANITSCH,

Honorary Treasurer, Straits Branch, Royal Asiatic Society.

IN MEMORIAM.

Sir. W. E. Maxwell, K. C. M. G.

Since its foundation in 1877, the Society has never sustained such a severe loss as that caused by the death of Sir William Maxwell, late governor of the Gold Coast.

Of his distinguished official career in this colony a very brief sketch will here suffice. From 1855 to 1869, he was employed in the Supreme Court, his father, Sir P. Benson Maxwell, being Chief Justice of the Colony. In 1867 he qualified as an advocate of the local bar, and for some years was a magistrate and commissioner of the Court of Request, acting for a short time as a judge of the Supreme Court of Penang. His legal attainments were of a high order, and qualified him to take the important part he did in the work of legislation, especially with regard to the Land question, to which he devoted his great abilities.

Appointed in 1874 Assistant Government Agent, Province Wellesley, he had his first opportunity of improving District administration. In the following year the Perak war took place, Mr. Maxwell serving as District commissioner with the Larut field force and being specially mentioned in despatches and receiving the Perak Medal. In 1878 he was appointed Assistant Resident, Perak, and it was during this period he gained his intimate knowledge of the Malays of the country—their language and folklore. In 1881 he was called to the bar (Inner Temple), and for some years after this, as Commissioner of land titles, he devoted himself to improving the land system in the Colony. The debates in the Legislative Council of this period and Reports on the Land Question shew what a complete mastery he had of the intricacies of land administration and legislation. In spite of determined opposition, he was able to carry out his policy, the good effects of which must now be admitted by his former critics. To him is due the system of District Administration which, started first in the Colony, has been reproduced with

such success in the Federated Malay States. After acting as Resident Councillor, Penang, from 1884 to 1889, Mr. Maxwell (who for his services in connection with the Nisero affair had been created a C. M. G.) was appointed in 1889 British Resident, Selangor, and in 1892 Colonial Secretary, S. S. After administering the Government here for some months, he was appointed Governor of the Gold Coast, where, after distinguished services in the Ashanti Expedition, he was made a K. C. M. G. His iron constitution was not proof against the deadly climate of the Coast, and he was cut off in the prime of life. The news of his death came as a great shock to his many friends in the Straits.

During his long career in the Colony and in the Native States, Sir W. Maxwell enjoyed exceptional opportunities of acquiring large stores of information on subjects of special interest to the Society. Of these opportunities he readily availed himself. A facile writer, his pen was never idle, and the hours which he could snatch from his all-absorbing official duties were devoted to literary work. His first contribution to the Society's journal was a paper on Malay Proverbs, written when he was Assistant Resident of Perak, and read at a meeting of the Society in May 1878. The second number of the Journal contained a further paper on the same subject, as well as "Notes on two Perak MSS." To the third number he contributed more work on Malay Proverbs, and on the Sakais and other aboriginal tribes of Perak. Soon after this, Sir W. Maxwell went home on leave; and his next contribution is to be found in the ninth number of the Society's Journal, which contains a most interesting paper, historical and geographical, entitled, "A journey on foot to the Patani Frontier in 1876" (67 pages), and another on the "History of Perak from native sources."

In 1883 he was unanimously elected to the honorary Secretaryship of the Society, and continued to hold that office till 1887, when, owing to absence from Singapore, he asked to be relieved of the arduous duties which it involved. During this period the Society owed its existence in a great measure to the energy of its Secretary, as it received but scanty support in the way of contributions from members. Sir William contributed papers on "The Dutch in Perak," on more "Malay Proverbs," and on "Shamanism in Perak," and on "The Laws and Customs

of the Malays with reference to the Tenure of Land." He also edited three Malay Fairy Tales, "Sri Rama," "Raja Donan," and "Raja Ambong," taken down by him from the lips of Malay rhapsodists, and published with a translation and with notes from his pen. In 1893 he was elected Vice President of the Society, and his official duties as Colonial Secretary from this time forward prevented his contributing to the Journal, though he continued to take the liveliest interest in the Society's work, and was able in many ways to give it material assistance.

The work he did for the Society is not, however, to be only judged by what he did under its auspices and in its name. He contributed to the Royal Asiatic Society's journal some interesting notes on Malay legends, and he wrote a Manual of the Malay Language which has done much to facilitate a scholarly acquisition of the idioms in which he took so deep an interest. He was in some measure acquainted with Arabic and Sanskrit, but will best be remembered for his work in connection with the indigenous elements of the Malay Language, its traditions and folk-lore. He collected a fine library of Malay MSS., which he has bequeathed to the Royal Asiatic Society. A great advocate of scholarly method, he did much to draw attention to the material that exists, in Dutch and other foreign languages, for the proper study of Malay. Indeed it was his view that an intending student of Malay should commence by learning Dutch; and there is no doubt that, with our limited literature on local subjects, his advice is worthy of consideration. That he was much influenced by Dutch scholars is often clearly traceable in his writings; and he had frequently to fight single-handed in defence of views which anyone acquainted with Dutch studies on the subjects would have at once admitted to be sound.

It is most difficult to exactly measure the extent of Sir William Maxwell's influence, as a scholar, upon his contemporaries and successors. He is constantly referred to by Dutch writers, and (except on one point) always with authority. His work on Malay Proverbs drew attention to the possibilities of a most interesting study, and led to the publication of at least one other valuable contribution on the same subject, from the pen of Mr. H. Clifford. His edition of Malay Rhapsodist tales also

attracted the notice of scholars to a literature which, being unwritten, is all the more likely to perish. It is noticeable in this respect that the fourth tale alluded to by Sir W. Maxwell, but never published by him, has been placed on record by Mr. Clifford, and published by the Society. It is however by his "Manual" that he is likely to have exercised his widest influence, in that he introduces every learner of Malay to a scholarly appreciation of Malay style and language, when all the learner's surroundings tend to degrade that language in his eyes. In his inaugural address on the foundation of the Straits Asiatic Society, the President, speaking of Logan's Journal, remarked that the weak point in that brave attempt was that the Editor was alone responsible for the management of his Journal, and that he was forced to give up, for want of sufficient co-operation, a work which was beyond the power of a single man to sustain. Is this to be true of the work of the Straits Asiatic Society? The President expressed a hope that the work of a Society might possess more permanence than that of an individual. "Individuals," said he, "are removed, but others remain." Nevertheless bearing in mind the limited range of interest in the Society's work, and the difficulty of securing contributors, any one who has been familiar with the Society's history from the first must feel how much depends on one man, and how much must have fallen on Sir William Maxwell in the past. The work done has been in a great measure his own work; and although there is fortunately no need to anticipate any abandonment of the aims which he did so much to forward, it is impossible either to minimize the extent of the Society's loss, or to believe that without increased effort on the part of members it will be possible to maintain in future numbers of the Journal the standard which the late Sir William Maxwell set.

C. W. S. K.

An Unexplored Corner of Pahang.

The Pahang River, as most people interested in Pahang affairs know, is the great artery which serves to keep Ulu Pahang in touch with the outer world.

Up it in large numbers, pass the Malay and (of late) Chinese boats, laden with supplies for the shops of Kuala Lipis, Punjom and Silensing, machinery for the mines, and from time to time those Europeans, whose business takes them into the Ulu.

From the main stream, branch off tributaries almost as large as the parent river, to the left the Semantan, up which most of the heavy stores and machinery for the mine and town of Raub passes, and which with its tributaries taps a large belt of country, including the Bentong tin bearing district.

Two or three days farther poling and the Tembeling goes off to the right, at the Kuala of which is situated the grave of the late E. A. Wise, who was unfortunately killed in the attack on Jeram Ampai stockade. He was a young man of great promise, a favourite with both Europeans and natives, and adds one more to the list of bright young fellows who have died in foreign lands on her Majesty's Service.

It was up the Tembeling that Baron Miklucho Maklay, one of the earliest Pahang explorers, made his way over into Kelantan, and from there down the Kelantan River to Kota Bahru, the capital of Kelantan.

That gentleman, whom I had the pleasure of meeting many years ago in Queensland, devoted his life and large income to exploring, and making an ethnological collection.

When I met him in Queensland, he was in quest of the skulls of a hairless tribe of natives, said to have been met with

in the "Back country," and he also succeeded in obtaining the skull of a notorious aboriginal outlaw, who had been recently executed. I remember he was particularly keen on this skull, as it was said to possess some abnormal measurements. An account of Baron Maklay's trip through Pahang, with copious notes on Sakei Ethnology, will be found in one of the early "Transactions" of the Straits Asiatic Society.

From beyond Kuala Tembeling, the Pahang River takes the name of the Jelai. The Lipis River branches off to the left at the town of that name, and some ten miles up is the landing for the Punjom Mine, while up towards its Ulu, it divides into many separate streams, chief among which are the Wong and the Semantan Ulu, which latter is formed by the united streams of the Simpam and Siang, from the former of which Raub Mine is taking its electric power, and on the latter the Liang Coffee Concession is situated.

From Kuala Lipis to Kuala Medang, the farthest point of European enterprise on the Jelai, is about 25 miles, and midway between Kuala Lipis and there, the Telang river comes in on the left, and is utilised by the No. 2 Concession of the M. P. Exploration Co. for getting supplies up to their property. It is only navigable for boats however, and villages are few and far between. A couple of miles farther up the Jelai, the Tanom comes in on the right, close to the residence of the Toh Rajah of Jelai. A great deal of alluvial gold working has been done in former times some distance up this river, in fact it was important enough at one time to have a "Kapitan China," but no reefs have been found.

Kuala Medang is the landing for the Silesing mines, and the last point of European settlement on the Jelai, in fact the Europeans who have been higher up than that, can be counted on one's fingers. The Medang, from which the landing takes its name, is merely a dirty little creek that would not float a boat. Like most of these places, it has its own legend, which was told me in all seriousness by an old Malay. Questioning him as to how the place came to be named Kuala Medang, he explained that a very long time ago, when it was a flourishing Malay village, a man lived there who had a boat

made of Medang timber. This man was fortunate enough to kill a Dragon, of which according to him there was only a very limited supply even then. He skinned it, and nailed the skin as a sort of sheathing round his boat, which had the effect of vastly increasing its speed so that a trip to Pekan and back, which in these effete times takes about a month, used to be accomplished in 24 hours. This lasted for some time, but one night, lying at anchor, the boat sank, and could never afterwards be found. It also seems that shortly after this, a close season was proclaimed for Dragons, and no more skins could be obtained, which was unfortunate, to say the least of it.

About half an hour's poling above Kuala Medang, the dismemberment of the Jelai begins, the Anak Jelai as it is called going off to the left, taking a S. W. course. A little farther up, the main stream divides again, the Seran going to the right or N. E., and the Telom going straight on or about due North. The Telom is much the larger stream of the three, and under ordinary conditions should still retain the name of Jelai. According to my ancient Malay friend, however, when the prehistoric geographers were naming these rivers, some little discussion arose among them as to which of the three should retain the name of Jelai, and to settle the matter they decided to weigh a given quantity of water from each, and the water from the left hand branch proving the heaviest, it retained the name. The Seran, from where it branches off to the right, keeps a pretty general N. E. bearing for a day and a half's poling, when Kuala Besi is reached. Then it divides again, the Seran keeping about its old course, while Sungei Besi bears slightly west of north, and its head waters get round very close to the head waters of the Telom. The Seran forms the highway to Kelantan and hundreds of Kelantan coolies pass up and down to work at the Silensing mines, there being a short day's tramp after leaving navigable water to get over the Dinding Range.

So far, I can only learn of three Europeans who have been over that route, and none who prior to my trip had been up Sungei Besi.

From the junction of the Telom and Seran up to Kuala

Besi, there are a few Malay houses at long intervals, but above that there are none whatever, the whole of it being Sakei country. There is evidence however of ancient native settlement on a large scale, as there are groves of Durian and other fruit trees, now grown to the size of the other jungle trees, where doubtless the villages originally stood. None of the Malays of the present day seem to have any idea as to who were the ancient inhabitants, or what was the cause of the exodus. It is also a noticeable fact that above Kuala Besi the names of rivers, mountains, etc., are all Sakei. The land on each side of the Seran is of much better quality than the general run of land in Pahang, and the paucity of settlements on it is remarkable.

About 8 hours poling above Kuala Besi, and toiling along slowly in a boat, against a rather rapid current, a huge mass of what I at first took to be smoke or fog loomed up among the trees on the right bank. To my surprise on getting closer, I I found it to be a huge isolated Tor of limestone, fully 400 feet high, the face of the cliff being quite perpendicular and snowy white. I then remembered that on one occasion, looking from the top of a high hill near the Silensing mine with a strong pair of glasses, we had made out a huge white mass in that direction, and many were our conjectures as to what it could be. Here was the mystery solved! About 50 feet up from the face of the cliff, I found a cave open to the front, capable of holding two to three hundred people, which is used as a camping ground by the Sakeis when out hunting, the limestone being blackened by the camp-fires of ages.

The sight of this vast natural monument, so different to the ordinary monotony of the Pahang jungle, was so absorbing, that it was long ere I could leave it. There is a similar cliff at the upstream end of the Tor, so that the view whether going up or down stream, is equally grand, and deep were my regrets that I had left my camera at home, and so could not get some photographs of it. The native name of this cliff is Gua Bumit.

About two hours' poling above that, a small stream, called Sungei Chok, comes in on the right bank, and there navigation ceases, or at least ought to, for to take a boat farther up,

is chiefly labour and sorrow, at least as far as coolies are concerned. Sungei Chok is not possible for a boat, but a day's jungle tramp (say about 20 miles) towards its Ulu, brings one to another limestone pile, of much greater dimensions. Its name is Gua Senoorat, it is from 1,500 to 2,000 feet high, and has a cave at its base capable of holding a couple of thousand people.

Doubtless in the fulness of time, when Kuala Lipis becomes the seat of Government and Europeans become more plentiful in the Ulu, these huge natural monuments will be more closely examined, but it will always be a source of satisfaction to feel that I was the first European to gaze upon them. What millions of years must have elapsed and what mighty changes must geologically speaking have occurred, since those huge beds were laid down in the ocean, and then slowly eroded and dissolved by the carbonic acid of the fresh water, after the ocean retreated, leaving only these isolated pinnacles to speak of what was once a continuous bed of limestone. The decomposition of this limestone doubtless has much to say for the better quality of the land on the Seran, of which I made mention earlier.

Leaving Kuala Chok, two hours poling brings one to Jeram Rimau, and though it is possible to drag an empty boat through it as I did, still future travellers would be well advised to make a camp, and leave their boat below it, and do any further travelling towards the Ulu on foot, for a short distance above the Jeram the river divides again into two streams which are both very shallow.

The right hand branch is still Sungei Besi, and the left hand one Sungei Wur, the waters of which I find almost join the head waters of the Telom, heading from opposite sides of the same spur. One day's tramp up either of these streams, brings one to the base of the main dividing range, on the other side of which is Kelantan.

After having my boat dragged through, and my baggage carried round the Jeram, I found it impossible to take the boat farther, and so made a camp at the junction of the two streams.

On the left bank of Jeram Rimau is a mountain fully 1,000 feet high, which the natives call Bukit Guroh, and to

which all sorts of legends appertain. It is chiefly a mass of huge rocks, and the Sakeis of that locality have a record of over 60 of their tribe who have been killed by tigers on it. The evening I camped there, a Sakei, who formed one of my party, went about 150 yards below the camp to fish, and while so engaged a tiger came out of the jungle at the base of the mountain and sat on a rock about 50 yards away. The Sakei abandoned his fishing lines and made for the camp yelling, and the tiger went back into the jungle. As a precautionary measure, I had a large fire built and kept going all night.

Next day, leaving a couple of coolies in charge of the camp, I tramped about ten miles up Sungei Besi, and came to a large Sakei clearing on a right hand branch known as Sungei Seringat.

The whole party were away on a hunting expedition to Ulu Telom, but I learned there were ordinarily about 50 of them lived there, and we occupied their houses for the night. The only thing worthy of note to be seen in them, was a string of jawbones, with the teeth intact, of several dozen monkeys in each house, hung up in the smoke above the fireplace. There were all sizes and kinds, and it is evident the Sakei when hungry spares neither age nor sex of the monkey tribe. Every monkey they kill and eat, they add his jawbone to the string, and when they are unsuccessful in hunting it is said they derive great satisfaction from gazing at and thinking over these mementos of former repasts. They have a clearing of a good many acres at Kuala Seringat, planted with plantains and paddy, and would seem to have been there for several years.

There is said to be tin in the streams farther on, close to the base of the dividing range, which is probably the case, but neither Malays or Chinese care to venture so far by themselves, as the Sakeis are said to be wicked, while the cost of getting supplies would be great, and the area is also probably limited.

From one of the hills at the Sakei clearing, a magnificent view was obtained of the limestone mountain, Gua Senoorat, distant about 20 miles. There would seem to be a large belt of

nearly flat country between Sungei Besi and Sungei Seran, as this mountain stands up as it were alone. Having seen all I wished to see in that locality, I came back to my camp at Kuala Wur, and had my boats and baggage taken below the Jeram, and there stayed the night. There was a rise of several feet in the river that night, and next day we came down to Kuala Besi at racing speed, doing in six hours, what it had taken us three days to go up.

I stayed the night at the house of an old Malay friend named Johor, and sitting chatting with him far into the night, he gave me the details of a tragedy which happened in his younger days, which, had a European been the chief actor, would have been cabled all over the world. Johor is now an old man, his wife is an old woman, and the two children who as infants took an unconscious part in the tragedy I speak of, are now a fine young man and woman, the son recently married and the daughter about to be, but both Johor and his wife still carry on their bodies the marks of the affray of which I speak. It took place some 20 odd years ago, and Johor, his wife and two young children were at that time living at Kuala Seran, *i. e.*, where the Telom and Seran, as I before explained, divide, and go in separate directions.

It was just after the Perak war, and one day, Johor was sitting in his house preparing a quid of betel, his wife plaiting a mat, and his two children sitting on the floor playing. Simultaneously two men appeared armed with spear and kris, one at the front and one at the back door. The one at the back door remained on the ground, while the one in front, mounted the three or four ladder-like steps into the house and made a vicious stab at Johor with his spear, which he in the act of rising managed to ward off. Failing in this the stranger reversed the spear, and dealt him a smashing blow across the head, with the heavy petaling wood handle. Half blinded by the blood which poured down over his face Johor seized the spear, and a desperate struggle ensued. Finding he could not wrench it away, the stranger drew his kris and tried to stab him, but he warded off the stabs as best he could with his arms, at the same time with his feet pushing the children away out of danger.

His wife attempting to assist him, seized the blade of the kris, and she showed me the two fingers, minus the tops, where it was dragged through her hands. Johor has the mark where his scalp was laid open by the blow from the spear, while his arms are scored with the marks of the cuts he received in warding off the stabs. Suddenly he bethought him of the Tumboh Lada (small dagger) in his belt, and drawing it he thrust it into the bowels of his assailant, who fell dying. All this though it takes some time to write, took place very quickly, and the man at the back door, who had been simply gazing at the struggle, on seeing his friend fall, rushed in. Johor seized his gun, which was standing loaded against the wall, but before he could get it up to fire, the stranger seized the muzzle, and a fierce struggle ensued for the possession of it. With a quick snatch however, Johor succeeded in dragging it from him, and shot him through the stomach, and killed him also. "Allah Tuan," said Johor, "Habis t'lahi rumah saya, macham orang potong kribau".

Asking him why this attack was made on him, he explained that these men were relatives of one of the Perak Rajahs, who had taken an active part in the war there, and were fleeing from the wrath to come, to Kelantan. They had crossed over from Perak, and made their way down the Telom, and being hard up, and hearing that Johor owned a couple of guns, they made up their minds to kill him, steal his guns and boat, and take his wife and children to sell for slaves in Kelantan. The next day, coming down to Kuala Medang, I was shown the place when the house originally stood, in which this affair took place.

W. Bertrand Roberts.

Birds collected and observed on the Larut Hills, Perak, in March and April 1898.

It was with the greatest pleasure that I found myself able to devote the months of February and March this year (1898) to forming a collection of birds on the Larut Hills in Perak. I believe that Mr. L. Wray, Jr., and Dr. Hartert for a few days in 1888, are the only other ornithologists who have collected on these mountains. Mr. Wray was fortunate in being the first man on the ground, and he made the most of his opportunities, obtaining, apparently, all the then new species which are at all common on the hills, and several which must be distinctly rare, as I failed to procure a single specimen of some of them in two months energetic collecting. The ornithological results of Mr. Wray's very successful collecting expeditions in the mountains were described by Dr. R. Bowdler Sharpe in two papers in the P. Z. S. for 1887 and 1888, which have been reprinted in the Journal of this Society (No. 19, p. 125., and No. 21, p. 1.)

These two papers deal with collections made on the Larut Hills and on the Batang Padang Mountains. For practical purposes they may both be taken as dealing with the birds of the Larut Hills, the avifauna of the higher mountains, as far as is yet known, not differing appreciably from that of the lower range. In fact, all the novelties yet obtained in the mountains of the Malay Peninsula occur at 3,000 to 5,000 feet altitude. As yet no single species has been discovered with a habitat restricted to the higher elevations of 6,000 or 7,000 feet, though it is quite possible that some such forms may exist.

Ninety-five species are enumerated in these two papers, which do not include birds not actually obtained. My list is longer, containing 113 species, as I have included all birds seen and identified as well as those shot. Mr. Wray's lists contain a number of species which I did not come across, while mine contains several which are not to be found in Mr. Wray's. The obvious inference to be drawn from this is that there are pro-

bably yet a number of species on the hills which neither of us met with and that our united lists are by no means complete. Some more novelties are sure to be obtained in time on these mountains; the small and inconspicuous species especially are likely to repay attention.

I am much indebted to Mr. J. P. Rodger, British Resident, Selangor, for assistance kindly afforded me while he was acting as Resident of Perak. In giving me permission to collect for scientific purposes Mr. Rodger requested me to restrict myself to four specimens of a species. It will be seen that on the whole I contented myself with considerably less.

I have also to thank Mr. L. Wray, Jr. for much information about the birds of the hills, and for the kindness with which he was always ready to go over his own collections with me when I was in Taipeng.

I hope shortly to publish elsewhere a more complete paper on the birds at present known to occur on the mountains of the Peninsula; in the mean time, I give a list of the species I met with during my two months on Maxwell's Hill. The brief notes as to elevation, etc., after each species must not be taken as hard and fast rules, but only as my individual experience of the bird's habitat, given for comparison with the notes of other observers. In this list I have arranged the species according to the classification in Messrs. Oates' and Blanford's "Bird" volumes in the Fauna of India Series, inserting those species not in the Indian list in what seemed to me their proper places. I have not, as is usually done, inserted the names of Families and Sub-families in large print between each few species, as in most cases it seems to me unnecessary waste of space.

The identifications in this list are, I believe, absolutely reliable. A numeral in brackets following the note on a species denotes the number of specimens I obtained. In all cases where such a number follows, the birds have been worked out by no less an authority than Dr. Ernst Hartert, of Tring Museum. The remaining species are identified by myself, but they are all birds with which I was previously, or have since become, familiar, and I am confident of the correctness of the names given. In some cases where species have been split up into recognized

sub-species the trinomials are there used for the sake of accuracy.

Three species new to science are included in this list, and their descriptions quoted: other birds are recorded from the mountains of the Peninsula for the first time.

Glancing through the list one is struck by the fact that over ninety genera are represented by the 113 species given.

The whole of the birds that I obtained are now in the Hon'ble. Walter Rothschild's magnificent collection at Tring.

1. *Rhinocichla mitrata* (S. Müll).

Very common above 3500 feet, feeding in noisy parties. (3)

2. *Trochalopterum peninsulae.* Sharpe.

Wray's Laughing Thrush. Only one obtained between The Hut and The Cottage, 4000 feet. (1)

3. *Pomatorhinus wrayi.* Sharpe.

Wray's Scimitar Babbler. Common at about 4000 feet generally in parties, which like others of the genus keep up a loud liquid call note. A very skulking bird, and not easy to procure. I failed to find the only one I shot.

4. *Gampsorhynchus saturatior.* Sharpe.

The Perak Ring-necked Shrike-babbler. Sharpe described this species from a specimen obtained by Mr. L. Wray on Gunong Batu Puteh, but Mr. Blanford does not consider it entitled to specific distinction (Fauna of India, Birds, I. p. 137). Hence I was particularly anxious to obtain specimens for comparison; but though I saw what must have been this bird once at 3500 feet, I failed to shoot it.

5. *Corythocichla leucosticta.* Sharpe.

Wray's Spotted Babbler. Not uncommon above 3000 feet; met with in small foraging parties hopping about on or near the ground among rocks and undergrowth. (3)

6. *Turdinus abbotti olivaceus.* (Strickl.)

Abbott's Babbler. Not uncommon in thickets near the foot of the hills. Dr. Sharpe identified a *Turdinus* sent by Mr. Wray from these hills as *sepiarius*. Mine was certainly the same as the bird Mr. Wray has marked *sepiarius*, but Dr. Hartert assures me it is the pale sub-species *(obiracens)* of *Turdinus abbotti*. (1)

7. *Alcippe peracensis.* Sharpe.

Wray's Black-browed Babbler. Very common at 3000 feet and upwards. (3)

8. *Alcippe cinerea.* (Blyth.)

Grey-headed Babbler. Equally common below 3000 feet. (3)

9. *Stachyris davisoni.* (Sharpe.)

Davison's Babbler. One shot at 2000 feet. (1)

10. *Stachyris poliocephala.* (Temm.)

One shot near the foot of the hills. A pair noticed collecting nest material in April. (1)

11. *Stachyridopsis chrysæa.*

Dr. Hartert says, "A sub-species, duller than Himalayan specimens. Either *St. chrysæa assimilis* or *hocagei*."

Fairly common above 3500 feet, feeding in little flocks which flutter about the undergrowth at the edge of a path quite regardless of being observed. So tame is it that I thought I should never get *far enough away* from one to shoot it, and did rather damage the one I shot; the other I actually knocked down with the barrel of the gun. I contented myself with a pair. (2)

12. *Mixornis gularis.* (Raffles.)

The Sumatran Yellow-breasted Babbler. I shot one at 2000 feet, but it was too damaged to preserve.

13. *Myiophoneus eugenii.* (Hume.)

The Burmese Whistling Thrush. Rather rare. I met with

it twice, on rocky streams in the ravines, but failed to get a specimen.

14. *Larvivora cyanea.* (Pall.)

Siberian Blue Chat. I saw this species once only—in April. It was hopping about the undergrowth too close to shoot, and as I backed away it disappeared into the jungle. Recently I came on this species again, on the summit of Bukit Kutu in Selangor, and at once recognized it as the bird I failed to get on the Perak hills. This time I succeeded in shooting it. This is one of the neatest looking little birds I know, the dark blue of the upper plumage contrasting admirably with the delicate white of the breast. 4500 feet.

15. *Brachypteryx nipalensis.* (Hodgs.)

Hodgson's Short-wing. I came on a *Brachypteryx* of sorts once at 4,000 feet. It showed a good deal of curiosity, fluttering nearer as I retreated and keeping too close to shoot. Not caring to blow it to pieces I left it alone. It was probably the above species, which Mr. Wray obtained on these hills.

16. *Sibia simillima.* (Salvad.)

The Malay Sibia. Very common above 3,500 feet, below which I never once saw it.

Feeds in parties, running along the branches, etc. with great rapidity and keeping up an incessant "*kree-kree-kree.*" While I was picking up a wounded one which I shot, the rest of the flock fluttered round me and abused me lustily—which perhaps I deserved. (3)

17. *Siva sordidior.* (Sharpe.)

The Malay Dull Siva. Met with in small parties searching for insects among the foliage of trees, and not descending into the undergrowth. I only met with it at about 4,000 feet. (4)

18. *Herpornis xantholeuca.* (Hodgs.)

The White-bellied Herpornis. Goes in good sized flocks, which search the branches of trees for insect food. It often

clings to the outside twigs of a bough in all sorts of tit-like attitudes. Not uncommon. (1)

19. *Pteruthius æralatus.* (Tick.)

Tickell's Shrike-tit. I met with this handsome little bird several times at about 4,000 feet, always in pairs and quietly searching the branches of tall trees for insects. (2)

20. *Chloropsis icterocephala.*

The Malayan Green Bulbul. Met with up to 3,000 feet, one of the most handsome of the genus. (1)

21. *Irena cyanea.* (Begbie).

The Malayan Fairy Blue-bird. This lovely species is tolerably numerous on the hills up to 3,000 feet. (1)

22. *Melanochlora sultanea.* (Hodgs.)

The Sultan Tit. Common. Mr. Wray notes having seen it as high as 4,500 feet. (4)

23. *Mesia argentauris.* (Hodgs.)

The Silver-eared Mesia. Not uncommon at 3,500-4,500 feet. (2)

24. *Criniger gutturalis.* (Bonap.)

The Malayan white throated Bulbul. Met with from 2,000 to 3,500 feet in pairs or parties. (2)

25. *Tricholestes criniger.* (Blyth.)

The Hairy-backed Bulbul. Fairly common up to 3,000 feet. (2)

26. *Hemixus cinereus.* (Blyth.)

White-throated Grey Bulbul. Common from 2,000 to 4,000 feet, but not so numerous as on Bukit Kutu where it is extremely plentiful. (2)

27. *Otocompsa flaviventris.* (Tick.)

Black-crested Yellow Bulbul. Not uncommon at 2,000 feet

or so, but far from numerous. (1)

28. *Iole tickelli peracensis.* (Hartert and Butler.)

A sub species of *I. tickelli tickelli*, differing in the darker and less rufous brown crown, more dingy grey ear coverts, and more ashy breast and flanks. Common from 3,500 feet upwards. (3)

29. *Iole olivacea.* (Blyth.)

The Malay Olive Bulbul. Common up to 2,000 feet. (3)

30. *Pycnonotus finlaysoni.* (Strickl.)

Finlayson's Stripe-throated Bulbul. Two or three pairs of this Bulbul used to frequent the bushes in the bottom of the ravine in front of the Tea Garden Bungalow, 2,000 feet. (1)

31. *Pycnonotus cyaniventris.* (Blyth.)

The Blue-bellied Bulbul. Not very plentiful. Obtained at 2,000 feet. (1)

32. *Pycnonotus salvadorii.* (Sharpe.)

The Small Olive Bulbul. Shot at 2,000 feet. The orange yellow eyelid and base of bill so conspicuous in freshly shot birds fades almost at once in skins. (1)

33. *Pycnonotus simplex.* (Less.)

Moore's Olive Bulbul. Common up to 2,000 feet. (3)

34. *Dendrophila azurea.* (Less.)

The Azure Nuthatch. Met with occasionally in small parties working about on the trunks of large trees. Sharpe remarks of a single specimen sent him by Mr. Wray that it was duller blue on the back than Javan examples. I particularly wanted specimens for comparison, but was unlucky in losing two out of the three I shot. The one I did get however quite bore out Sharpe's remarks, and the bird is probably entitled to sub-specific distinction. (1)

35. *Bhringa remifer.* (Temm.)

The Lesser Racket-tailed Drongo. Common at a high

elevation. I did not notice it below 3,000 feet. (I)

36. *Orthotomus atrigularis.* (Temm.)

Black-necked Tailor Bird. A few small tailor-birds which frequented the clearing round the Tea Garden bungalow were, I think, of this species. I somehow omitted to shoot a specimen.

37. *Cisticola beavani.* (Wald.)

Numerous in the Tea Garden clearing, frequenting the weeds and bushes near the jungle edge. Dr. Hartert tells me that they are paler and less rufescent than any of the Indian specimens with which they have been compared. I regret that I did not shoot a few more. (2)

38. *Cryptolopha butleri.* (Hartert.)

Butler's Flycatcher Warbler. A new species. For the benefit of local readers I quote the description from the Bulletin of the British Ornithologist's Club, No. LIV, p. 50. Adult male, Crown of the head dark rufous with a broad deep brown lateral stripe; sides of the head and back ashy grey; lower back, rump, scapulars, smaller upper wing-coverts, edges to the primaries and retrices yellowish green; larger upper wing-coverts blackish, with a greenish wash and greenish yellow tips; throat and fore-neck to the chest pale grey; middle of the abdomen white; sides of body, under wing-coverts, axillaries, vent, and under tail-coverts lemon-yellow. Iris reddish brown; bill dusky, mandible yellowish fleshy; feet brownish yellow.

Wing 51-54 m m., tail 42—45, bill 6. 5—7, tarsus 16-16.5. Nearest to *C. castaneiceps*, but easily distinguished by its darker crown and grey back besides other differences. I found this little bird not uncommon at 4,000 feet and saw it as low as 3,000 feet. I found 3 nests during April; they were very like nests of the common European Wren, placed under overhanging banks, two containing three young each and the other a clutch of 3 fresh eggs, of the usual *Cryptolopha* type—pure white. (2).

39. *Phyllergates cucullatus.* (Temm.)

Golden-headed Warbler. Not uncommon above 4,000 feet,

frequenting the sides of the path, the garden round The Cottage, etc. Exactly like a Tailor-bird in appearance and habits, though differing in several important generic characteristics. The discovery of its nest would be of great interest. Oates suggests that this genus may nest in holes of trees, like *Abrornis*. The bird seemed to me so very tailor-bird-like in its habits that I should hardly expect it myself to differ very much in nidification. (2).

40. *Sutoria maculicauda.* (Moore.)

2,000 to 3,000 feet. Not common. I found a nest, a typical tailor-bird's, sewn between two leaves, and containing one egg of the Tailor-bird type. I cannot give a description, as on my revisiting the nest next day I found it empty. This was in April. (1.)

41. *Lanius tigrinus.* (Drap.)

The Thick-billed shrike. Met with half-a-dozen times up to 3,500 feet, mostly immature specimens. 1

42. *Tephrodornis gularis.* (Raffles.)

Malay Wood Shrike. Only shot it once at 3,000 feet, but probably overlooked it on other occasions, owing to the difficulty of identifying birds feeding high overhead in lofty trees. (1)

43. *Pericrocotus wrayi.* (Sharpe.)

Wray's Minivet. Replaces the next species at about 3,500 feet, above which it is fairly common. 2

44. *Pericrocotus speciosus fraterculus.* (Swinhoe.)

The Burmese Scarlet Minivet. Obtained from 1,500 feet to 3,000 or 3,500, where it gives place to the last form. 2

45. *Pericrocotus flammifer.* (Hume.)

Davison's Scarlet Minivet. I shot a male at just over two thousand feet; it was very badly shot and I did not preserve it, expecting to get others.

46. *Pericrocotus igneus.* (Blyth.)

The Fiery Minivet. I shot a female Minivet at 4,000 feet

with a red rump. It was unfortunately too damaged for preservation. I think it must have been *igneus*. Sharpe's *Pericrocotus croceus* I looked for in vain.

47. *Graucalus larutensis.* (Sharpe.)

The Larut Cuckoo Shrike. Not uncommon above the Maxwell's bungalow clearing, but I only shot one, fortunately a female, which has not been described previously, Sharpe having only seen the male (1)

48. *Hemichelidon sibiricus.* (Gm.)

Sooty Flycatcher. A very common winter visitor. A few were still about at the beginning of April. (2)

49. *Hemichelidon ferrugineus.* (Hodgs.)

Ferruginous Flycatcher. Not uncommon between 1,500 and 3,500 feet. I did not notice it higher. (1).

50. *Cyornis tickelli.* (Blyth.)

Tickell's Blue Flycatcher. I saw this species once at 4,000 feet. I have since obtained it at 3,000 feet on Bukit Kutu. Malayan specimens are smaller than Indian ones.

51. *Nitidula hodgsoni.* (Moore.)

The Pigmy Blue Flycatcher. I obtained one at 4,500 feet. Oates says he cannot find a single note on its habits. This specimen was moving about in a big bunch of a parasitic plant growing upon a thick bough; once or twice it fluttered out and captured a small insect in true flycatcher style, and once I saw it hover for a second or two something like a Honeysucker. I believe this is the first time it has been obtained in this locality. Oates gives its distribution as Sikkim, Assam and the Naga hills. (1.)

52. *Muscicapula westermanni.* (Sharpe.)

The Malay Little Pied Flycatcher. Not uncommon at 4,000 feet. (1)

53. *Digenea malayana.* Sharpe.

The Malay White Gorgeted Flycatcher. I obtained two

specimens at 4,000 feet. While engaged in setting a steel trap baited with grains of rice, meant for any small mammal which might get caught, I saw two of these little flycatchers hopping about the ground and the low undergrowth, and uttering a sharp little squeak. I shot one and the other flew off. Two hours later, however, I found it in the trap I had just set, doubtless attracted by the freshly turned earth and dead leaves I had sprinkled over the plate. I did not meet with the species again. Very close to *D. submoniliger*. (2.)

54. *Alseonax latirostris*. (Raffles.)

The Brown Flycatcher. Winter visitor; fairly common. (1.)

55. *Culicicapa ceylonensis*. (Swainson.)

Grey-headed Flycatcher. Common above 2,000 feet.

56. *Niltava grandis*. (Hodgs.)

The Large Niltava. Not uncommon below the Cottage, at about 4,000 feet. Has a good song. Smaller than Indian examples. (2.)

57. *Terpsiphone affinis*. (Hay.)

The Burmese Paradise Flycatcher. I saw adult white males two or three times between 2,000 and 3,000 feet, but failed to get a specimen.

58. *Rhipidura albicollis*. (Vieill.)

White-throated Fantail Flycatcher. Almost always among the parties of birds which one comes upon at about 4,000 feet. White tips to retrices broader than in Indian examples. Bornean ones again are like Indian. (1.)

59. *Henicurus schistaceus*. (Hodgs.)

The Slaty Forktail. A snap shot in the dusk at an unfamiliar Forktail darting up a stream luckily resulted in a specimen of this species. This was at 2,000 feet, and the only time I met with it. New to the Larut Hill list. 1

60. *Hydrocichla ruficapilla*. (Temm.)

The Chestnut-headed Forktail. Occurs up to 4,000 feet,

frequenting the streams which filter through the dark ravines. When these are in spate after a downpour of rain, the Forktails come out on to the roads. As a rule this is a very shy bird, but some individuals are extremely tame. I found a nest in a cleft of a moss-grown rock by the edge of the path. It was composed very largely of earth, thickly covered with green moss and was consequently remarkably heavy for its size. It contained two longish cream white eggs, very glossy, and spotted with rufous. (2.)

61. *Copsychus saularis*, (Linn.)

The Magpie Robin. A few pairs round the Tea Garden and Maxwell's bungalow.

62. *Geocichla innotata.* (Blyth.)

The Malay Ground Thrush. A blue-grey *Geocichla* with an orange breast flew past me once in thick jungle at 2,000 feet; it is almost certain to have been this species.

63. *Monticola gularis.*

I obtained one specimen—an immature male—of this very rare little Thrush in thick jungle at about 2,500 feet. (1.)

64. *Monticola cyanus solitaria.* (P. L. Müll.)

The Eastern Blue Rock Thrush. I noticed a blue Rock Thrush frequenting the rocks, fallen trees, etc., on the Tea Garden clearing; it was very shy and eluded pursuit for some days. When obtained it proved to be this species. Elevation 2,000 feet. (1.)

65. *Uroloncha acuticauda.* (Hodgs.)

Hodgson's Munia. Fairly plentiful about the Tea Garden clearing. They were breeding in April, and I found several of their well known nests.

66. *Hirundo gutturalis.* (Scop.)

The Eastern House Swallow. Numerous round the bungalows on the hill.

67. *Motacilla melanope.* (Pall.)

The Grey Wagtail. Common about roads, streams, clearings, etc., at all elevations. Had not left by middle of April.

68. *Anthus rufulus malayensis.*

The Malay Pipit. Should not perhaps be included in this list. I mention it as there was one specimen in my collection, but it was shot at the foot of the hills and not on them. (1.)

69. *Anthus maculatus.* (Hodgs.)

The Indian Tree Pipit. The only Pipit met with on the hills A party of a dozen or so frequented the Maxwell's bungalow clearing throughout March and beginning of April. I never saw them settle on a tree when disturbed. Probably their habits are more arboreal in the breeding season than at other times. (1.)

70. *Æthopyga wrayi.* (Sharpe.)

Wray's Honeysucker. These beautiful little birds are common at 3,500 feet and upwards. The Scarlet Hibiscus flowers in the gardens on the hill are a great attraction to them. They visit these principally in the hottest part of the day—for an hour or two after noon. I may mention that I recently obtained the bird again on the summit of Bukit Kutu, Selangor, 3,300 feet. It has, I believe, hitherto only been obtained on the Perak hills. It will probably prove to occur throughout the Peninsula where the mountains rise to over 3,000 feet. Mr. Wray, writing to Dr. Sharpe says, "There is another species of Honeysucker, but I was not able to get a specimen of it." I kept a sharp look out for this, but saw no other species on these hills. Since then, however, I have twice shot, on Bukit Kutu and at Ginting Bedei, a lovely scarlet Honeysucker with brilliant violet moustachial stripes, and a sort of coronet of the same colour, formed by two lines running from the nostrils and encircling the crown. From want of books of reference I have had to send it home for identification, and have not yet heard about it. Possibly this was the other Honeysucker seen by Mr. Wray. (5.)

71. *Arachnothera magna.* (Hodgs.)

Common between 3,500 and 4,000 feet; I saw one or two as

low as 2,000 feet. A very active restless bird, always on the move. Constantly in the jungle something darts past one with a whirr, and only its characteristic sharp squeak enables one to recognize the spider-hunter. (4.)

72. *Dicæum ignipectus.* (Hodgs.)

Fire-breasted Flowerpecker. I shot one at 4,000 feet. Probably common, but it is impossible to identify these tiny birds with certainty on tall trees. (1.)

73. *Prionochilus ignicapillus.* (Eyt.)

Crimson-breasted Flowerpecker. Fairly common up to 4000 feet. (1.)

74. *Prionochilus maculatus.* (Temm.)

The White throated Flowerpecker. Met with on the higher parts of the hill. (1.)

75. *Serilophus rothschildi.* (Hartert and Butler.)

Rothschild's Broadbill. The discovery of this very beautiful little broadbill—the third known species of its genus—made a red-letter day for a collector. I first came across it at 2,500 feet. Two little greybreasted birds were sitting side by side on a tall tree and, not being able to make them out I fired at them and killed both. The birds fell into a dense tangle of thorny rattan, and at the end of half-an-hour's search I was just giving up in disgust when I found one of them. Seeing at a glance that it was a novelty and a very beautiful one, I renewed my search, cutting away the abominably thorny shoots of the rattan one by one with my hunting knife, and eventually succeeded in finding the other. I subsequently came upon a party of these broadbills at 3,500 feet. They were engaged in quietly searching the foliage of a large-leaved tree for insects, and every now and then uttering a clear little whistle like "pee-u." Once or twice I saw one hover at the extremity of a bough to catch an insect on the outermost leaves, something after the manner of a *Pericocrotus*. On the whole their actions struck me as rather sluggish. I quote the description of this new species rom the Bulletin of the British Ornithologists' Club, No. LIV.

p.50. "Differs from *S. lunatus* with which it agrees in the peculiarly shaped tips of the longest primaries, in being darker and greyer above; crown of the head pure grey, not pale rusty brown; ear-coverts grey with hardly a tint of brown, while they are pale brown in *S. lunatus*, and the rufous colour on the secondaries is deeper; round the eye a narrow ring of white feathers. 'Iris greenish brown, mottled with golden specks; eyelid and base of mandible for about $\frac{1}{8}$ inch, bright gamboge yellow; bill pale whitish blue, tip and lateral edges whitish; feet pale greenish chrome, claws milky blue '(A. L. Butler)" Named in compliment to Mr. Walter Rothschild (3.)

76. *Psarisomus dalhousiae.* (Jameson.)

The Longtailed Broadbill.

Mr. H. Palgrave Turner shot one of these lovely broadbills at 3500 feet, and kindly gave it to me. It is a very perfect specimen and is now in the Selangor Museum. (1.)

77. *Gecinus rodgeri.* Hartert and Butler.

Rodger's Woodpecker.

A new species obtained at 3,500 feet. I am not sure whether the full description has yet appeared in print; it has not yet reached me, and I do not wish to anticipate it. Dr. Hartert, comparing it with *G. chlorolophus* and *G. chlorigaster* says, *in epist.* "Differs from *chlorolophus* in its much darker and more uniform green upperside, shorter wing, and darker abdomen with much narrower cross-bars. Differs from *chlorigaster* in its larger size, longer wing, and in the middle of the crown being green and not red." Named in honour of Mr. J. P. Rodger, British Resident, Selangor. (1.)

78. *Chrysophlegma humii.* (Hargitt.)

The Chequered-throated Woodpecker.

I shot one at 3,500 feet. I have also met with it in the low country. (1.)

79. *Miglyptes grammithorax.* (Malh.)

The Fulvous-rumped Barred Woodpecker.

Less common than *M. tukki* on the hills. I saw it once at 3,000 feet.

80. *Miglyptes tukki.* (Lesson.)

The Buff-necked Barred Woodpecker.

Common from 2000 to 4000 feet; generally in pairs, but sometimes in small parties of 5 or 6. The note is a long trill. (4.)

81. *Chrysocolaptes validus.* (Temm.)

Golden backed Bar-winged Woodpecker.

Chiefly a low country form; I saw one pair at 2000 feet and obtained one specimen. (1.)

82. *Vivia innominata.* (Burton.)

The Speckled Piculet.

This diminutive Woodpecker is apparently scarce, though its small size doubtless causes it to be overlooked. My specimen was shot at 4,000 feet, associating with a large foraging party of various small birds. It was swinging on a trailing liana-like creeper, across which it had perched, and might almost have been mistaken for some sort of Flower-pecker. (1.)

83. *Psilopogon pyrolophus.* (S. Müll.)

The Bar-billed Barbet.

I found this very beautiful barbet from 3,000 to nearly 5000 feet. Mr. Wray says it is a very silent bird, only occasionally uttering a harsh note like that of a Woodpecker. I never heard it utter any note that I can remember, which bears out what Mr. Wray says as to its being usually so silent, but Hartert has described its note very differently. (J. f. O. 1889.) (3)

84. *Mesobucco duvauceli.* (Lesson.)

The Crimson-eared Barbet. Very common, from the low country up to 4000 feet. This is one of the most annoying birds I know to try and shoot. It ensconces itself among the foliage at the very top of a very high tree, often, in the low country, a durian, and there keeps up for hours together, an in-

cessant "twit-twit, twit-twit!" very like the note of an English nuthatch. Owing to its turning its head from side to side while calling, these monotonous notes seem to come from a different direction every minute, and even when one has succeeded in locating the bird more or less exactly it is impossible to see it owing to its small size, leaf-green colour, and its habit of keeping absolutely motionless (except for turning its head about) as long as it is calling. You may clap your hands, shout and throw stones into the tree as much as you like, but you won't get it to move, much less take wing and give a flying shot. If two of you are shooting together, however, things are simplified considerably. You put the other gun on the far side of the tree and fire three or four shots at hazard into the top of it. Then at last the little barbet elects to move, and the other man gets a very high snap shot at a diminutive bird flying very jerkily away, which he *may* hit, but is much more likely not to!

All four birds I have obtained thus have been males. (2.)

85. *Cyanops oorti.* (S. Müll.)

Common: my specimens were obtained from 2,500 to 4,000 feet. (4.)

86. *Chotorhea chrysopogon.* (Temm.)

Gold Whiskered Barbet. Common: from the foot of the hills to over 3000 feet. (3.)

87. *Calorhamphus hayi.* (Gray.)

The Brown Barbet. Fairly common. Low country and up to 3500 feet; generally in parties; rather sluggish in its movements. (4.)

88. *Merops sumatranus, Raffles.*

The Sumatran Bee-eater.

Flocks of this Bee-eater were met with up to 2000 feet (1.)

89. *Nyctiornis amictus.* (Temm.)

The Red-bearded Bee-eater.

Tolerably common, from the low country up to 4500 feet. Blanford and other authorities say "nidification unknown," but I find in No. 24 of this Journal, p. 169, a nest and eggs described by Lieut. H. J. Kelsall, which are doubtless rightly attributed to this species. I have several times found nest-holes in banks in heavy forest which could only have been those of this bird, though I never found one in use to settle the question. The note of this bird is extraordinary, a very hoarse and loud "ka-ka! ka-ka!", which, until I found out the author of it, I thought must come from some sort of hornbill at least! (2)

90, *Dichoceros bicornis.* (Linn.)

The Great Hornbill.

I met with this grand Hornbill several times near the top of the Hill, but it was considerably scarcer than the next species.

91. *Buceros rhinoceros.* (Linn.)

The Rhinoceros Hornbill.

The commonest large Hornbill on the hills, where their extraordinarily loud and discordant notes may be heard throughout the day at intervals. (3.)

92. *Anorrhinus galeritus* (Temm.)

The Bushy-Crested Hornbill.

Not uncommon at 2000 feet and upwards. I have also met with it at Ginting Bedei and Bukit Kutu in Selangor, but not yet at less than 2000 feet elevation. This Hornbill is almost always in small flocks, which keep up a curious shrill call at intervals. It always reminded me forcibly of the chorus raised by a litter of hungry puppies whose mother has tantalized them by paying them a short visit and leaving them again! I found them shy and difficult to shoot, making off by short flights from tree to tree directly they were approached. Their habits seemed to me very regular, a flock visiting a particular tree just at noon for several days, until the fruit supply was exhausted. (2.)

93. *Rhinoplax vigil.* (Forster.)

The Helmeted Hornbill.

This magnificent Hornbill, though constantly heard, seems very shy, and though I saw a pair once or twice I failed to get a specimen. Davison has described its note excellently. He says, "The note is very peculiar and powerful; it begins with a series of whoops, uttered at intervals that grow gradually less till, after ten or a dozen quick repetitions the call ends in a harsh cackling laugh." This account would be hard to improve on. The first notes sound not unlike the distant blow of an axe on timber, and it is doubtless this species that is referred to in the Malay legend of the man who cut down his unfortunate mother-in-law's house and then burst into a peal of laughter, for which he was punished by being turned into a bird. The use of the heavy ivory casque of this hornbill remains to be discovered.

94. *Chætura gigantea.* (Temm.)

The Brown-necked Spine-tail Swift.

Often seen hawking over the hills.

95. *Chætura leucopygialis.* (Blyth.)

The Grey-rumped Spine-tail. Very common up to 3000 feet or so; I forget whether I observed it higher. It has none of the arrow-like speed of the larger Spine-tails. (2.)

96. *Collocalia francica.* (Gmel.)

The Little Grey-rumped Swiftlet.

Common at the higher elevations.

97. *Collocalia linchi.* (Horsf. and M.)

Horsfield's Swiftlet. The same applies. This charming little swift is very fond of building in rooms, etc. A pair did their best to start a nest in the Tea Garden bungalow when I was there. They never succeeded in getting anything to stick to the white paint of the ceiling, but carried on the attempt perseveringly for a long time. In the Andamans, where this species is numerous, I have seen it roosting in buildings, clinging to the walls in clusters like a swarm of bees. On these occasions I have often seen one catch its mate, unable to find room

for a foothold beside it, by the tip of the wingfeathers and hold it hanging thus for several seconds. (2.)

98. *Macropteryx longipennis* (Rafinesque.)

The Malayan Crested Swift. I occasionally noticed it hawking over the tops of the jungle up to nearly 5,000 feet.

99. *Macropteryx comata.* (Blyth.)

The Tufted Tree-Swift. Seen at 2,000 feet, but not as numerous as in the low country.

100. *Caprimulgus indicus jotaka.* (Temm.)

The Jungle Nightjar. A few pairs frequented the Tea Garden clearing (at 2,000 feet) and used to hawk along the jungle edge at dusk. I shot a pair. (2.)

C. macrurus and *Lyncornis temmincki*, so common in the low country, I neither saw nor heard on the hills.

101. *Harpactes erythrocephalus.* (Gould.)

The Red-headed Trogon. Met with several times at 3,500 feet or so. (1.)

102. *Harpactes duvauceli.* (Temm.)

The Red-rumped Trogon. I obtained one very young example at 3,500 feet. (1.)

103. *Zanclostomus javanicus.* (Horsf.)

The Lesser Red-billed Malkoha.

Seems to me to range higher up the hills than the other birds of this group. It is not uncommon at 3,500 feet. It is very partial to the big wingless females of one of the larger stick insects, for which it searches the branches so systematically that the insect's wonderful likeness to a dead twig avails it nothing. Having pecked and bruised the mantis into a state of helplessness, the bird proceeds to pull off the strong spiny legs one by one and then swallows the long body head first. I have taken 3 of these insects, 7 or 8 inches long and nearly as thick as one's little finger from the stomach of one of these Malkohas. (1.)

104. *Rhinortha chlorophæa.* (Raffles.)

Raffles' Green-billed Malkoha.

This very common low country bird ranges up the hills to about 2,000 feet, above which I have not seen it.

105. *Ketupa javanensis.* (Less.)

The Malay Fish-Owl.

I disturbed one from a bough overhanging a stream in thick jungle near the foot of the hills.

106. *Spizaëtus albiniger.* (Blyth.)

Blyth's Hawk-eagle.

A pair of these very beautiful eagles used to visit the tea garden clearing regularly during my stay there, attracted by a brood of chickens, one or two of which they carried off daily for a week. Coming round the corner of a cattle-shed one day I came upon one of them sitting on a stump not more than ten yards from me. Instead of flying he merely erected his crest and stared at me, and I backed quietly away to 30 yards distance and shot him. (1.)

107. *Spilornis bacha.*

The Malay Snake-eagle.

Frequently seen, but not shot.

108. *Accipiter virgatus* (Reinw.)

The Besra Sparrow-hawk.

Seen once or twice up to 3,000 feet. I found a nest with the bird sitting near the foot of the hills, in April, but the tree was quite unclimbable.

109. *Treron nepalensis.* (Hodgs.)

The Thick-billed Green Pigeon.

Small flocks met with and a few birds shot up to 3,500 feet.

110. *Ducula badia.* (Raffles.)

The Copper-backed Imperial Pigeon.

A few of these fine Pigeons were seen, generally passing over at a great height. I shot one specimen at 3500 feet. (1.)

111. *Chalcophaps indica.* (Linn.)

The Bronze-winged Dove.

Heard and seen up to 3,500 feet.

112. *Macropygia ruficeps.* (Temm.)

The Little Malay Cuckoo-Dove.

Fairly common from 2,000 to 4,000 feet. I shot several specimens, most of which were rather knocked about and were handed over to the cook. Mr. Wray notes Cuckoo-Doves as rare on these hills, and Sharpe wrote of the only specimen that Mr. Wray sent him that it appeared to be *M. tusalia.* Mine were all *M. ruficeps.* (1.)

113. *Argusianus argus.* (Linn.)

The Argus Pheasant.

Heard frequently up to 2,500 feet, but as usual, not seen. (1—trapped.)

This completes the list of species identified during my two months on the Larut Hills. I met with two other birds which I have left out of the above list, not knowing where to insert them. One was a dark grey Thrush-like bird which I obtained a glimpse of only in thick jungle at 3,500 feet, and which may perhaps have been *Melanocichla peninsularis* (Sharpe.) The other was a small robin-like brown bird, with a good deal of white on the bases of the tail-feathers. I found this bird one morning in the same trap which caught one of the specimens of *Digenea malayana* as mentioned above. Elevation 4,000 feet. I accidentally omitted to send it to Tring with the rest of my collections, and though I did so subsequently I have not yet received the identification.

A. L. Butler.

A Catalogue of the Ferns of Borneo and some of the adjacent Islands which have been recorded up to the present time.

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The following list contains, I believe, all the Ferns that have been recorded from Borneo, the Sulu Archipelago, the Natunas, and a few small islands close to the Borneo Coast. It is probably very far from being a complete catalogue of all the members of this interesting family that exist in that region. The Ferns belonging to Borneo itself have been collected almost exclusively in the State of Sarawak, and the Territory of British North Borneo. These two countries together occupy about one third part only of the whole island, the remainder (with the exception of the small kingdom still held by the Sultan of Brunei) being in the possession of the Dutch Government. It is possible that in Dutch scientific publications a few species not mentioned here may have been recorded, but, if so, they have not come to my knowledge.

The large number of new species which have been found in recent years within a comparatively small area, chiefly by Signor Beccari, Mr. Burbidge, Mr. Charles Hose, Dr. G. D. Haviland and myself, leads to the belief that a rich harvest awaits the collector who shall hereafter visit the less known districts of Dutch Borneo. Of the 430 species and varieties contained in this list, 114 were first found in Borneo. Seven of these have since been met with elsewhere; but there remain 107 which have no other habitat at present known. Some of them are exceedingly rare, several having been only once found.

I have not in all cases mentioned the collector's name: but it is to be understood that when no name is given, that of

Mr. Charles Hose is to be supplied for the Ferns that come from the Baram district of Sarawak, including Mt. Mulu, Mt. Dulit, Mt. Lambir, Niah, &c., and my own in all other instances.

I have followed the arrangement in Hooker and Baker's Synopsis Filicum, 2nd Edition, 1874. The Roman numerals refer to the Genus, and the Arabic to the Species; and I have indicated the position of new Ferns, as Mr. Baker does, by giving them the number of the species nearest to them with the addition of an asterisk.

It is much to be desired that the surviving author of the Synopsis may find it possible to bring out a new edition, as it has been long out of print, and an enormous addition to the number of known Ferns has been made since its publication. The Supplement, "Ferns discovered or described since 1874," and subsequent lists of new discoveries published by Mr. Baker only in part supply this want, as they are hardly more than lists: for descriptions an immense number of publications have to be consulted, and these are seldom accessible to persons who live in the regions where novelties are to be found.

FILICES.

SUB-ORDER I. GLEICHENIACEAE.

GLEICHENIA. (Gen. ii Syn. Fil. p. 11.)

Gleichenia circinata, Sw. (Syn. Fil. ii. 3.) Mt. Kinabalu, Mr. F. W. Burbidge, 5,000-6,000 ft. and Dr. G. D. Haviland, 10,500 ft.
Distribution : From Australia and New Zealand to Malacca and the Philippines.

—— var. *borneensis*, Baker in Jour. Bot. 1879, p. 37. Mt. Kinabalu, Mr. F. W. Burbidge.

G. (Mertensia) longissima Bl. (Syn. Fil. ii. 7.) = *G. glanca* Hooker, the oldest name. Mt. Dulit and Mt. Matang. Sarawak, not under 2,500 ft. though elsewhere in Malaya it is found at a much lower elevation.
Distribution : China, Japan, Malaya, West Indies.

—— variety *arachnoides* Mett. (Syn. Fil. l. c.) = *G. bullata*, Moore. Mt. Kinabalu, 7000 ft. Sir Hugh Low.

G. (Mert.) sp. Large, tripinnatifid, stem and rachises covered with broad acuminated brown scales having whitish cartilaginous edges, the crossing of which on the surface produces an appearance that may be called "cobwebby." Pinnae 18 in. long, 4-5 in. wide, oblong-lanceolate. Secondary pinnae 2-2½ in. l. ¼ in. wide, cut down nearly to the rachis into oblong blunt segments, with margins much recurved. Sori covered by the large spreading scales.
A single specimen in the Sarawak Museum contributed by Dr. G. D. Haviland from Mt. Kinabalu, 8,000 ft. His number 1950. If this is the *G. arachnoides* Hk. from this

locality, marked var. B of *G. longissima* Bl. in. Syn. Fil., it deserved a fuller description than the brief one " broad cobwebby." I think it is a distinct species.

G. (Mert.) flagellaris, Spr. (Syn. Fil. ii. 19). Common in the low country and up to 2,000 ft.
Distribution: Madagascar: Bourbon: throughout Malaya: Fiji.

G. (Mert.) vestita Bl. (Syn. Fil. ii. 21.) Mt Dulit, Mt. Matang and Mt. Santubong, Sarawak, 2,500 ft. " Seems conspecific with *G. hirta* Bl." Baker Jour. Linn Soc., Vol. xxii. p. 222. Distribution: Malay Islands.

—— var. *paleacea*, Baker in Jour. Bot. 1879. p. 38. N. Borneo by Mr. F. C. Burbidge. Habitat not specified particularly.

G. (Mertensia) dichotoma Willd. (Syn. Fil. ii. 23). Very common everywhere. *G. linearis*, Clarke, is said to be the oldest name.
Distribution: Tropical and subtropical regions of the old and new world and as far north as Japan.

—— var. *major*, Moore. Ind. Fil. 376. Sr. Beccari (vide his Borneo Ferns by Cesati), at Marup on the Batang Lupar River, Sarawak.

—— var. *divaricata* Moore = *pteridifolia* Presl. Beccari, Malesia vol. iii. p. 17. Same habitat as the preceding variety.

Sub-Order II. Polypodiaceae.

Tribe I. Cyatheaceae.

Cyathea. (Gen. iv. Syn. Fil. p. 15.)

C. Brunonis, Wall. (Syn. Fil. iv. 2.) Common in Sarawak at a slight elevation. Caudex a foot or more in height.
Distribution: Throughout Malaya.

C. Havilandi, Baker in Trans. Linn Soc. iv. p. 249. (37*). Mt. Kinabalu 10,500 ft. Dr. G. D. Haviland.

C. suluensis, Baker in Jour. Bot. 1879 p. 5. (38*). Sulu Archipelago, Mr. F. C. Burbidge.

C. dulitensis, Baker in Kew Bulletin, No. 110, Feb., 1896, p. 40. (38*). Mt. Dulit Sarawak 4,000 ft.

C. polypoda, Baker in Trans Linn. Soc. iv. p. 250. (38*). Mt. Kinabalu 7,000 ft. Dr. G. D. Haviland.

C. sarawakensis. Hook. (Syn. Fil. iv, 39) = *C. Lobbiana* Hook. (Syn Fil. iv. 41) = *Alsophila alternans* Hook. (Syn. Fil. vi. 48). See Baker's *Ferns discovered or described since 1874.* Mt. Matang near the foot.
Distribution: Malay Peninsula and Islands.

C. assimilis, Hooker. (Syn. Fil. iv. 40). Mt. Matang 2,000 ft. and Mt. Dulit, Sarawak.
Distribution: Celebes.

C. beccariana, Cesati, in Fil. Becc. Born. p. 3. found by Beccari in Sarawak. Baker says "belongs to *C. assimilis*," *Ferns discovered or described since 1874.*

ALSOPHILA. (Gen. vi. Syn. Fil. p. 31.)

A. comosa, Hk. (Syn. Fil. vi. 50). The Baram district, and Santubong, Sarawak.
Distribution: Malayan Peninsula and Islands.

A. contaminans Wall. (Syn. Fil. vi. 51). Mt. Matang and elsewhere; common. The tallest and most graceful of the Malayan Tree Ferns.
Distribution: Malayan Peninsula and Islands.

A. ramispina, Hooker. (Syn. Fil. vi. 55.) Caudex to 8 ft. Mt. Matang 3,000 ft. and Mt. Dulit in the Baram Residency, Sarawak.

A. glabra, Hk. (Syn. Fil. vi. 58.) Mr. F. C. Burbidge, recorded by Baker in Jour. Bot. 1879, p. 38, but with a (?). Habitat not specified.
Distribution : Malay Peninsula and Islands. China and throughout India.

A. vexans, Cesati in Fil. Becc. Born. p. 4. Found by Beccari, Sarawak, 1865. Baker says he cannot separate it from *A. glabra* Hooker.

A. dubia, Beddome in Jour. Bot. 1888, p. 1. Tab. 279[a] Baker in *Ferns discovered since 1874* says it has been found in Borneo, but does not give habitat or collector's name. I have in my collection a single pinna of a fern collected in the Natuna Islands by Mr. A. H. Everett which is like *A. dubia*, but the specimen is too incomplete for positive identification.

A. latebrosa, Hooker (Syn. Fil. vi. 59.) Common in Sarawak up to 2,000 ft.
Distribution : Almost throughout India proper, Malaya, Formosa, etc.

A. Wallacei, Mett. (Syn Fil. p. 450.) Habitat "Borneo, (Wallace.") I know nothing of this Fern beyond the notice of it in the Synopsis Filicum referred to.

A. Burbidgei, Baker in Jour. Bot. 1879. p. 38. To the description there this addition should be made; Stipes 2 ft. or more long, having a dense fringe of brown lanceolate scales, $\frac{1}{2}$ in. long by 1 l. broad, along the under surface, extending to beyond the lowest pinnæ; the upper surface armed with minute prickles. Mt. Matang Sarawak, 500 to 800 ft. and the Baram River. Mr. Burbidge's specimens came from North Borneo.

MATONIA (Gen. viii. Syn. Fil.)

M. pectinata, Br. (Syn. Fil. viii. 1.) Mt. Matang and Mt. Santubong, Sarawak, 2,500 to 3,000 ft. It has lately been found at a low elevation on the Carimon Islands near

Singapore by the Hon. E. E. Isemonger.
Distribution: Malay Peninsula and adjacent Islands.

M. sarmentosa, Baker in Jour. Linn. Soc. xxiv. 256, Plate xiv. and in *Ferns discovered since 1874*. Found by Mr. Charles Hose hanging from the roof of a limestone cave at Niah in the Baram Residency, Sarawak. The specific name is unfortunate as it is not sarmentose. Baker describes it in his *Ferns discovered or described since 1874* as "the most interesting novelty that has been found in the period under review."

Tribe II. DICKSONIEÆ.

Dicksonia. (Gen. xiii. Syn. Fil. p. 49.)

D. (Cibotium) Barometz. Link. (Syn. Fil. xiii. 2.) Mt. Dulit, Sarawak.
Distribution: Malayan Peninsula and Islands; Assam and S. China.

D. sorbifolia, Sm. (Syn. Fil. xiii. 16.) Miri in the Baram Residency, Sarawak. "= *D. papuana*, T. M." Baker.
Distribution: Moluccas and Island of Henimoe; Hindostan.

D. (Patania) ampla, Baker in Jour. Liun. Soc. xxii. p. 223. Near Sena on the Serin River, Sarawak, 1884. Found also in Perak, Malay Peninsula.

D. (Patania) gomphophylla, Baker in Jour. Linn. Soc. xxii. p. 223. Mt. Matang, Sarawak, 1884. 2,000 ft.

Lecanopteris (Gen. xiv.* Baker Jour. Bot. 1881, p. 366.)

L. carnosa, Bl. = *Polypodium lomarioides* Kunze in Syn. Fil. Mt. Matang and Mt. Dulit, Sarawak.
Distribution: Malaya; Philippines; Formosa.

L. deparioides, Baker = *Davallia deparioides*, Ces. in Fil. Becc. Born. Sarawak by Beccari; Kuching, Sarawak, growing on a Ficus at Bishop's House.

Tribe III. HYMENOPHYLLEÆ.

Hymenophyllum. (Gen. xvi. Syn. Fil.)

H. blumeanum, Sp. 2. See under H. polyanthos Sw. (Syn. Fil. xvi. 18.) Mt. Gading, Lundu, Sarawak, 2,000 ft.

H. javanicum, Spreng. (Syn. Fil. xvi, 21). Sarawak, growing on trees overhanging rivers Found by Beccari on Gunong Poi.
Distribution : throughout India and Malaya ; the Philippines, N. Zealand, Australia.

H. australe, Willd, "a variety of H. javanicum, Baker M. S. Natuna Islands; Mr. A. H. Everett, 1892.

H. dilatatum, Sw. (Syn. Fil. xvi, 27.) Mt. Matang, Sarawak. 2000 ft. 1884.
Distribution : Java, N. Zealand, and Polynesian Islands.

H. formosum, Brack. Recorded under this name as found by Mr. Burbidge in North Borneo and in Sulu by Baker in Jour. Bot. 1879, p. 38 and 65. Given in Syn. Fil. as a synonym of *H. dilatatum* Sw.

H. borneense, Hk. M. S. S. (Syn. Fil. xvi. 31.) Found by Thomas Lobb, when collecting for the Messrs, Veitch, probably about 1845, on hills near Sarawak at 2,700 ft. See Cesati Fil. Becc. Born. p. 5.

H. pachydermicum, Cesati in Fil. Becc. Born. p. 7. Found by Beccari on Gunong Poi. Sarawak in 1866, Near. "*H. ciliatum*." Baker, in *Ferns discovered or described since 1874*, therefore to be numbered (34*).

H. obtusum, Hooker, and Arn. (Syn. Fil. xvi. 35.) North Borneo, Mr. F. C. Burbidge. See Baker in Jour. Bot. 1879, p. 38.
Distribution : N. Guinea *(Beccari)* East Africa, Oahu, Sandwich Islands.

H. subflabellatum, Cesati in Fil. Becc. Born. p. 8. and see Baker *Ferns discovered or described since 1874*, who gives as the position it should have in Syn. Fil. the number (52*). Beccari, Undup River, Batang Lupar, Sarawak 1865.

H. Smithii, Hk. (Syn. Fil. xvi. 63.) North Borneo. Mr. F. C. Burbidge, Jour. Bot. 1879, p. 38. Natuna Islands, Mr. A. H. Everett.
Distribution : Malay Peninsula, Java, Celebes, Philippines.

H. denticulatum, Sw. (Syn. Fil. xvi. 69). Found by Mr. A. H. Everett in the Natuna Islands, 1892.
Distribution : Khasi Hills, Moulmein, Java.

H. brachyglossum, A. Braun : vide Cesati in Fil. Bec. Born. p. 7. Santubong, by Beccari in 1866.

H. Neessii, Hook. (Syn. Fil. xvi. 70). On rocks and trees. Mt. Matang, Gunong Poi, Dulit, etc. and North Borneo.
Distribution : Malaya, Ceylon, Philippines, Fiji.

—— var. *H. aculeatum minus* Cesati Fil. Becc. Born. p. 8. Beccari, on Mt. Matang, Sarawak, 1866.

H. sabinæfolium. Baker (Syn. Fil. xvi. 71). North Borneo by Mr. F. C. Burbidge. Baker in Jour. Bot. 1879. p. 38.
Distribution : Java.

TRICHOMANES (Gen xvii. Syn. Fil.)

T. Motleyi v. d. Bosch. (Syn. Fil. xvii. 10). Mt. Matang, by Beccari in 1866.
Distribution : Ceylon, Moulmein, Andamans, New Caledonia.

T. beccarianum Ces. Fil. Becc. Born. p. 8. tab. 1. fig. 2. Beccari same locality. Baker says that he cannot separate this or *T. cognatum* Ces. Fil. Becc. Polyn. p. 5. from *T. Motleyi*, Ferns discovered or described since 1874.

T. vortitum Baker. N. Sp. Sent to Kew in 1893 and so named by Mr. Baker who said it was to be described in the Kew

Bulletin, but I have not yet seen the description, Jan. 1899. Gunong Gading, Lundu, Sarawak, 1892.

T. muscoides, Sw. (Syn. Fil. xvii, 20). Mt. Gading, Lundu, 1,200 ft. Found also by Mr. A. H. Everett in the Natuna Islands.
Distribution: Tropical America, Asia, Polynesia and Africa.

T. sublimbatum C. Mull. (Syn. Fil. under *T. muscoides*) Beccari on Mt. Matang, "on moist rocks."

T. saxifragoides, Presl. (Syn. Fil. xxii. 22). On most of the hills near Sarawak. This is the *T. minutum* Bl. of Ces. Fil. Becc. Born. pp. 8 and 11.
Distribution: Java. New Ireland, Fiji, and Philippines.

T. proliferum, Bl. (Syn. Fil. xvii. 24). Gunong Gading, Lundu, Sarawak at 2,000 ft. 1892.
Distribution: Java, Philippines, Ceylon, and western slope of the Neilgherries.

T. digitatum, Swartz (Syn. Fil. xvii. 24). Mt. Matang, Sarawak; and by Beccari on Gunong Poi. In N. Borneo Mr. F. C. Burbidge collected "two different forms, one lengthened out with remote branches, the other short, with close branches." See Baker in Jour. Bot. 1879, p. 38.
Distribution: Malaya, Polynesia, Mascarenes.

T. (*Craspedoneuron*) *ignobile*, Cesati in Fil. Becc. Born, p. 9, (41*). Beccari Sarawak 1865. "Midway between *T. bicorne* and *T. intramarginale.*" Baker in *Ferns discovered or described since 1874.*

T. endlicherianum V. D. B. (Baker M. S.) (Syn. Fil. under *T. humile* Forst, xvii. 44). Mt. Matang, Sarawak. 1892.

T. pallidum. Blume. (Syn. Fil. xvii. 46). Sarawak, in the Batang Lupar and Undup Rivers by Beccari. In North Borneo by Mr. Burbidge.
Distribution: Ceylon, Malaya, Queensland, Samoa.

T. serratulum, Baker (Syn. Fil. xvii. 47) "On Labong Perak Borneo"—Found only once apparently; but by whom, and when?

T. Filicula, Born. (Syn. Fil. xvii. 48). Common in Sarawak and N. Borneo. Very variable in habit.
Distribution: widely spread throughout the Tropics of the Old World, and in Polynesia.

T. pyxidiferum, L. (Syn. Fil. xvii. 49). This name is given at Kew to three ferns which appear to me absolutely distinct from one another, two of which are from Mt. Matang, and one from the banks of the Sarawak River. In North Borneo Mr. Burbidge found "a handsome variety, with unusually compound rather crisped fronds." Baker in Jour. Bot. 1879 p. 38.
Distribution: Hindustan as far north as Khasia; Ceylon; Moulmein; New Caledonia; Cape of Good Hope; Bourbon, Fernando Po, Angola, Tropical America.

T. macrochilon, Baker (49*) Trans. of Linn. Soc. iv. p. 250. Mt. Kinabalu 7,000 ft. Haviland.

T. denticulatum, Baker (Syn. Fil. xvii, 52). Sarawak and North Borneo. Previously found by Mr. Motley.

T. javanicum, Blume. Common.
Distribution: Tropical Hindustan, Malaya, Polynesian Islands and Madagascar.

—— var. *zollingeri*, Cesati. Fil. Becc. Born. p. 10. Beccari, at Banting Sarawak.

—— var. *rhomboideum*. (J. Sm). Ces. l. c. Beccari, Banting, Sarawak.

T. Hosei, Baker in Jour, Linn. Soc. xxii. 223. tab. 12. Mt. Matang, Sarawak 2,000 ft. 1882.

T. brevipes, Baker (Syn. Fil. xvii. 62). Mt. Gading, Lundu, Sarawak by Beccari in 1866.
Distribution: Singapore, Leyte, Philippines.

T. rigidum. Sw. (Syn Fil. xvii. 70). Mt Matang and Santubong, Sarawak; Mt Kinabalu by Haviland and Mr. Burbidge. In Borneo this fern has the stipes and main rachis fibrillose, and the crown of the tuft often densely so.
Distribution: throughout the tropics in both hemispheres.

T. apiifolium, Presl. (Syn. Fil. xvii. 71). By Mr. Burbidge and Dr. Haviland in N. Borneo, by Beccari on Mt. Matang, under the name of T. *meifolium*, and by Mr. A. H. Everett in the Natuna Islands.
Distribution: Malaya; Philippines; Polynesia; Norfolk Island.

T. millefolium, Prsl. Beccari on Mt. Matang.

T. maximum, Bl. (Syn. Fil. xvii. 72). Common.
Distribution, Malaya to N. Australia and Polynesia.

T. hispidulum. Mett. (Syn. Fil. p. 466.) The Baram district, Sarawak; N. Borneo, Mr. Burbidge;

T. gemmatum. J. Sm. (Syn. Fil. xvii. 76.) By Beccari on Gunong Poi 1866.
Distribution: Malayan Peninsula, Venezuela, North of Brazil, Polynesian Islands, Java, Philippines.

T. ericoides, Hedw. (Syn. Fil. xvii. 77). Borneo. Where and by whom collected I do not know. It is the. *T. longisetum*, Bory. of Cesati in Fil. Becc. Born. p. 10.
Distribution: Java, Samoa, Bourbon.

T. Pluma, Hook. (Syn. Fil xvii. 77* p. 466). Matang, Santubong, N. Borneo and the Baram Residency, at 3,000 ft. and upwards.
Distribution: Perak, Malay Peninsula.

T. trycophyllum, Moore. (Syn Fil. xvii 77,* p. 466.) N. Borneo. Burbidge. Low. Haviland. Baker in Jour. Bot 1879. p. 38, thinks this will prove conspecific with *T. Pluma.*
Distribution: Malaya, New Guinea, New Caledonia.

T. foeniculaceum Bory. (Syn. Fil. xvii. 78.) Sandakan, Banting, Mt. Matang, etc.
Distribution: Mauritius, Bourbon, and Rockingham Bay, Australia.

DAVALLIA. (Gen. xviii. Syn. Fil.)

§ *Humata* Cav.

D. (Hum) heterophylla, Sm. (Syn. Fil. xviii, 1). Common in Sarawak.
Distribution: Malaya, and Polynesian Islands.

D. (Hum) angustata, Wallich (Syn. Fil. xviii. 2). Santubong and Mt. Matang: not common.
Distribution: Throughout Malaya.

D. (Hum) parallella, Wallich (Syn. Fil. xviii 3). At Kuching and on rocks at Gunong Ayer and Santubong, the two mouths of the Sarawak River.
Distribution: Malaya and Polynesian Islands.

D. (Hum) pinnatifida, Baker in Jour. Linn. Soc. xxiv. p. 257. (4*) "Intermediate between *D. pectinata* and *D. pedata*." (Baker) Niah, in the Baram Residency, Sarawak.

D. (Hum) pedata, Smith, (Syn. Fil. xviii. 6) Sarawak and N. Borneo. Common on trees and rocks.
Distribution: Khasia, southward to Ceylon, Malaya Hongkong, Queensland, Mascaren Islands.

D. (Hum) alpina, Bl. (Syn. Fil. xviii, 7) Mt. Matang and Mt. Kinabalu, 10,500 ft. Dr. Haviland, 1491.
Distribution: Malaya, Polynesia.

§ *Leucostegia*.

D. (Leucostegia) oligophlebia, Baker, in Jour. Bot. 1888, 323. (13 *) A small graceful fern found by Mr. C. Hose on Mt. Lambir, in the Baram Residency Sarawak, and by myself on Matang near the top, i.e. at 3,000 ft.

D. (*Leucos.*) *nephrodioides*, Baker, in Jour. Linn. Soc. xxiv, 257 (16 *) Paku, Sarawak, and Niah, Baram Residency, Sarawak.

D. (*Leucos.*) *Hosei*, Baker in Jour. Linn. Soc. 1888 p. 323 (17*) Mt. Lambir, Sarawak.

D. (*Leucos.*) *parvula*, Wallich (Syn. Fil xviii 21). Common on trees near the sea-shore, and on Mangrove trees in rivers.
Distribution : Singapore.

§ *Odontoloma.*

D. (*Odont.*) *repens*, Desv. (Syn. Fil. xviii, 27.) Mt. Mulu, Sarawak, Mr. C. Hose. The immature plants have often fine wide-creeping rhizomes with short fronds and deeply lobed pinnæ, resembling somewhat those of *Acrostichum sorbifolium* at the same stage of growth = *Lindsaya pectinata*, Bl.
Distribution : Assam, Neilgherries, Ceylon, Malaya, Polynesian Islands and Mauritius.

§ *Prosaptia.*

D. (*Pros*) *Emersoni*, Hk. and Gr. (Syn. Fil. xviii, 31). Common on trees.
Distribution : Madras, Ceylon, Malaya, Philippines.

D. (*Pros*) *contigua*, Sw. (Syn. Fil. xviii, 32) Mt. Dulit, Sarawak, Mt. Kinabalu. Dr. Haviland.
Distribution : Ceylon, Malaya, Polynesia.

§ *Endavallia.*

D. Lobbiana, Moore (Syn. Fil. xviii, 35). Found by Mr. Thomas Lobb about 1845 and not observed afterwards till 1886 when I met with it in the Sempadi River, a branch of the Tisak in the Batang Lupar Residency, Sarawak.

D. solida. Swartz (Syn. Fil. xviii, 39). Common.
Distribution : Malaya and the Polynesian Islands.

—— var B. *candata*, Cav. is said to be found in Borneo Moore. Ind. Fil. p. 300 *teste* Cesati in Fil. Becc Born. p. 12. I have not seen it.

D. elegans, Swartz (Syn. Fil. xviii. 40). Kuching; elsewhere not common.

—— var B. *coniifolia*, Hk. was found by Beccari on the Undup River, Sarawak, Cesati, Fil, Bec. Born.
Distribution: Ceylon, Malaya, China, Polynesian Islands, Tropical Australia, Madagascar, Angola, Fernando Po, Johanna Island.

D. pallida, Mett. (Syn. Fil. p. 469, 40 *) = *Dav.* (*Loxoscaphe*) *Beccariana*, Cesati, in Fil Becc. Born. p. 15. Mt. Matang, Jambusan, upper Sarawak, and Niah in the Baram Residency.
Distribution: Aneiteum.

D. bullata, Wallich. (Syn. Fil. xviii. 47.). Lundu, Sarawak,
Distribution: Hindustan, Malaya, Japan.

D. Veitchii, Baker in Jour. Bot, 1879 p. 39. (49*). Found by Mr. F. C. Burbidge on Mt. Kinabalu in N. Borneo at 6,000 ft.

§ *Microlepia.*

D. (Micro) pinnata. Cav. (Syn. Fil. xviii. 82.) The Sarawak form of this fern corresponds to the variety *D. gracilis* Bl. as described in Syn. Fil: that is to say the lower pinnæ are cut down nearly to the rachis into linear oblong entire, or sub-entire, lobes. But Mr. Baker has given the name *D. gracilis* Bl.= D. *Luzonica* Hk. to the form described below. This is intermediate between that and the type. Mt. Matang 2,500 ft.
Distribution: (of the type) Malay Peninsula, Penang, Java, Celebes, Polynesian Islands.

—— var. *gracilis Bl.* = D. *Luzonica* Hk. (Syn. Fil. xviii. 52 var). Lower pinnæ distinctly bipinnate, the pinnules quite as deeply toothed as the pinnæ of the type. Mt.

Matang and the Baram district, Sarawak.

D. (Micro) deparioides Ces. See *Lecanopteris deparioides*, Bk.

D. (Micro) ciliata. Hk. (Syn. Fil. xviii, 55). Mr. F. C. Burbidge at Kaung, N. Borneo.
Distribution: Philippines.

D. (Micro) Speluncæ, Baker, (Syn. Fil. xviii, 65). Common in Sarawak and N. Borneo.
Distribution: Himalayas to Ceylon; Malaya; S. E. China; Polynesian Islands to Norfolk Island; Queensland; West Tropical Africa, Madagascar, Bourbon; Natal; W. Indies to Brazil.

§. *Stenoloma.*

D. (Sten) tenuifolia Sw. (Syn. Fil. xviii, 74). Common in many parts of Sarawak, and in North Borneo.
Distribution: Tropical Asia; Polynesia; Japan; Mascarenes.

—— var. *chinensis*, Sm. Mt. Matang, Sarawak. Doubtfully distinct.

LINDSAYA. Gen. xx. Syn. Fil.

§. *Eulindsaya.*

L. ovata, J. Sm. (Syn. Fil. xx. 4). Mt. Matang, Sarawak, by Beccari, 1866.

L. concinna, J. Sm. (Syn. Fil. xx. 5.) "Borneo" Cesati Fil. Becc. Born. p. 14. "Not distinct specifically from *L, cultrata*, Sw." Baker in *Ferns discovered or described since 1874.*

L. jamesonioides, Baker in Jour. Bot. 1879, 39. To the description given there Baker adds, in *Ferns discovered or described since 1874*, "Hook. Ic tab. 1626." Mt. Kinabalu, North Borneo. Mr. F. C. Burbidge. 9,000 ft. and by Dr. G. D. Haviland 5,500 ft.

L. cultrata, Swartz (Syn. Fil. xx. 7). The type is common. A form found on Mt. Matang agrees exactly with the description of var B. L. *japonica* in Syn. Fil. Another form the upper edge of which is shallowly lobed is called var. *L. Lobbiana.* Hk. at Kew.
Distribution (of type,) Himalayas, Neilgherries, Malaya, Bourbon, Queensland Madagascar.

L. crispa, Baker in Jour. Bot. 1879. p. 39. In *Ferns discovered or described since 1874* he adds Hook. Ic. tab. 1627. North Borneo, Mr. F. C. Burbidge.

L. pectinata, Bl. (Syn. Fil. xx. 10) another name for *Davallia* (*Odontoloma*) *repens*, Dew which see.

L. scandens, Hk. (Syn. Fil. xx. 11.) Common. When mature it is bipinnate and quite undistinguishable from *L. trapeziformis* with which I believe it to be conspecific. It is entirely unlike *L. pectinata* in habit, texture and cutting: and I think it must be through some mistake that it is said in Syn. Fil. to be doubtfully distinct from this last. In young, but fruited forms, it is sometimes found with the pinnæ almost imbricated and prettily variegated with white veins.

L. flabellulata, Dry. (Syn. Fil. xx. 16.) Common in Sarawak.
Distribution: Malaya to S. China; N. India, Ceylon, Australia.

—— var. A fern sent to Kew from Mt. Matang, near the summit 13,000 ft, is said by Mr. Baker to be "a much divided form of *flabellulata*." I give a description of it as I am inclined to think it deserving of the honour of being reckoned as a Species.
Rhizome short creeping, densely clothed with linear-lanceolate brown scales which extend to the basis of the stipes. Stipes otherwise naked, slender, chestnut-brown, 6 in. long, 3-4 in, wide, simply pinnate in the upper part, fully quadripinnatifid in the lower. Ultimate divisions suborbicular-cuneate, rather deeply lobed $\frac{1}{4}$ in. long and as broad. Veins flabellate, once forked in each lobe. Sori

rather narrow, interrupted. Indusium persistent. I have only found it on one occasion.

L. gomphophylla. Baker in *Ferns discovered or described sinc 1874.* "Borneo, Sir Hugh Low."

L. trapeziformis, Dry. (Syn. Fil. xx. 17.) Not uncommon probably only the mature form of *L. scandens* Hk.
Distribution: Tropical America, Malaya, Ceylon.

L. borneensis, Hk. M. S. S. (Syn. Fil. xx. 18.) Mt. Matang and elsewhere.
Distribution: Malay Peninsula in Mountain Forests.

L. Natunæ. Baker in Kew Bulletin Feb. 1896. p. 40. Found by Mr. Ernest Hose in the Natuna Islands.

§ *Isoloma.*

L. (Iso.) *indurata.* Baker in Jour. Bot. 1888, p. 324, Niab, Baram Residency, Sarawak and Mt. Kinabalu, North Borneo, Dr. Haviland.

L. (Iso.) *divergens*, Wallich, (Syn. Fil. xx. 29.) Common. There are two forms often found in the same locality, both in Borneo and the Malay Peninsula but not in any way running into one another. In the typical form the two edges of the pinnæ are very nearly parallel. In the other form the base is half as long as the pinna, the upper surface is cultrate, curved from the point of the auricle to the extremity of the pinna, and the underside is cut away as in *Asplenium resectum.*
Distribution: Throughout Malaya.

L.(Iso.) *lanuginosa*, Wall. (Syn. Fil. xx. 30.) Growing abundantly with *Neprolepis acuta* which it so curiously resembles, on mangroves by the Salak River, Sarawak.
Distribution: Singapore and Malay Peninsula; Tropical Australia, Mauritius, Africa, mouth of the Kongone River (Livingstone expedition.)

L. (Iso.) *trilobata*, Baker in Jour. Bot. 1891, p. 107. Mt. Mulu, and Niah, Baram District, Sarawak.

§ *Synaphlebium.*

L. (Syn.) *lobata*, Biret (Syn. Fil. xx. 37.) Common in Sarawak.
Distribution : Neilgherries and Ceylon ; Malaya ; Queensland ; Polynesian Islands.

L. (Syn.) *davallioides*, Blume, (Syn. Fil. xx. 38.) Common.
Distribution : Throughout Malaya.

§ *Schizoloma.*

L. (Schiz.) *cordata*, Gaud. (Syn. Fil. xx. 39.) Limestone, Mt. Mulu, and Niah, Baram Residency, Sarawak. Rare.
Distribution : Malayan Peninsula.

L. (Schiz.) *ensifolia*, Sw. (Syn. Fil. xx. 41.) Common.
Distribution : Hongkong, Malaya, Himalayas to Queensland and eastward to Polynesian Islands ; Mauritius, Madagascar, Natal, Cape Colony, the Gninea coast.

L. (*Schiz.*) *Fraseri*, Hk. (Syn. Fil. xx. 43.) Banting, Sarawak by Beccari , a sterile specimen only : Cesati in Fil. Becc. Born. p. 15. Considered by Baker to be an Asplenium in an immature state, probably *A. nitidum.*
Distribution : Queensland.

ADIANTUM. (Gen. xxi. Syn. Fil.)

A. diaphanum, Bl. (Syn. Fil. xxi. 15.) North Borneo, Mr. F. C. Burbidge.
Distribution : Java, S. E. China, Aneiteum, Fiji, New Caledonia, Norfolk Island, New Zealand, N. S. Wales.

A. Hosei, Baker in Jour. Bot. 1888, p 324. On Limestone cliffs at Paku, Upper Sarawak, and in the Baram Residency, Sarawak.

A. Capillus-Veneris, L. (Syn. Fil. xxi. 41.) Kudat, North Borneo, on the cliff below the Residency. The only habitat of this cosmopolitan species as yet discovered in Borneo.
Distribution: Very general in both the old and new world.

In Malaya found also by me in the neighbourhood of Malacca.

A. stenochlamys, Baker in *New Ferns*, Ann. Bot. Vol. v. 1891, (58*). Santubong, Sarawak; Kudat (Dr. Fraser) and Pulo Gaya (Sir H. Low.) British North Borneo.
Distribution: Malay Peninsula.

CHEILANTHES (Gen. xxv. Syn. Fil.)

C. tenuifolia, Sw. (Syn. Fil. xxv. 35.) Common.
Distribution: Himalayas to Ceylon, Malaya, S. E. China, Polynesian Islands, N. Zealand, Australia and southward to Tasmania.

PTERIS (Gen. xxxi. Syn. Fil.)

§ *Eupteris.*

P. longifolia, L. (Syn. Fil. xxxi. 1.) Common; Sarawak, Labuan, N. Borneo.
Distribution: Tropical and warm temperate regions all round the world.

P. melanocaulon, Fee. (Syn. Fil. xxxi. under 4.) Sulu Islands Mr. F. C. Burbidge. Described as *P. Treacheriana* by Baker in Jour. Bot. 1879, p. 65. tab. 5, but stated to be indentical with *P. melanocaulon* Fée by Baker in *New Ferns* Ann. Bot. Vol. v. 1891.

P. ensiformis, Burm. (Syn. Fil. xxxi. 10.) Kudat and Banggi Island, North Borneo.
Distribution: Himalayas to Ceylon, Malacca, Chusan and Loo Choo Islands. Southward to Tropical Australia; eastward to Samoa and Fiji.

P. semipinnata, L. (Syn. Fil. xxxi. 16.) Gaya, North Borneo.

P. quadriaurita, Retz. (Syn. Fil. xxxi. 22.) Common.
Distribution: All round the world within the Tropics and a little beyond them.

—— var. *digitata*, Baker in Jour. Bot. 1879, p. 40 but recognized as identical with the next species by Baker in letter June, 1888.

P. Grevilleana, Wall. (22 *). Beddome F. B. I. p. 112 and Supplement p. 23. Clarke considers it to be more nearly allied to *P. ensiformis* than to *P. quadriaurita*. Smambu on the Saribas River; Baram; and N. Borneo.
Distribution: North India, Malay Peninsula, Tonquin.

P. furcans, Baker in Jour. Bot. 1888, p. 324. (22 *). Baram, Sarawak.

P. Walkeri, Baker in Jour. Bot. 1888, p. 324 (22 *). Banggi Island near Kudat. British North Borneo.

P. longipinnula, Wall. (Syn. Fil. xxxi. 23.) Banting, Padih River, etc., Sarawak,
Distribution: Hindostan, Malayan Peninsula, Japan.

§ *Pæsia.*

P. (*Pæs.*) *aquilina*, L. (Syn. Fil. xxxi. 40.) Common.
Distribution: All round the world in the Tropics and Temperate Zones.

—— var. *arachnoidea*, Kaulf at Beccari. Marup, Batang Lupar River, Sarawak.

[*P.* (*Pæs.*) *Radula*, Baker in Jour. Bot. 1880, p. 211. I mention this fern because Baker in *New Ferns*, Ann. Bot. Vol. v. 1891 says "Mountains of Borneo" Beccari, but this is, I think, a misprint for *Sumatra*.]

§ *Campteria.*

P. (*Campt.*) *patens*, Hk. (Syn. Fil. xxxi. 47.) Said in Syn. Fil. to be found in *Borneo*. I have not met with it.
Distribution: Ceylon, Malay Peninsula, Philippines and Society Islands.

P. (*Campt.*) *Wallichiana*, Agardh. (Syn. Fil. xxxi. 50.) Kuching and Samarahan River, and probably elsewhere in Sarawak.
Distribution: Himalayas, Malaya, Philippine Islands, Japan.

§ *Litobrochia.*

P. (*Lito.*) *incisa*, Thunb. (Syn. Fil. xxxi. 81.) Sandakan, North Borneo.

Distribution: Throughout the Tropics in both Hemispheres.

—— var. *aurita*, Blume, Mt. Matang, Sarawak.

P. (*Lito.*) *marginata*, Bory = *P. tripartita.* Sw. (Syn. Fil. xxxi. 82.) Baram, Sarawak.
Distribution: Malaya, Polynesian Islands, Queensland, Ceylon, Sylhet, Seychelles, Mauritius, Kaffraria and West Tropical Africa.

CERATOPTERIS. (Gen. xxxii. Syn. Fil.)

C. thalictroides, Brong. (Syn. Fil. xxxii. 1.) Common in ditches.
Distribution: Throughout the Tropics in quiet waters.

LOMARIA. (Gen. xxxiii. Syn. Fil.)

L. procera, Spreng. (Syn. Fil. xxxiii. 22.) Mt. Matang, Sarawak 3,000 ft.
Distribution: Mexico and W. Indies to Chili; Malaya and Polynesian Islands, New Zealand, S. Australia, Tasmania and S. Africa.

L. (*Plagiogyria*) *pycnophylla*, Kunze (Syn, Fil. xxxiii. 38.) Mt. Dulit, Sarawak 4,000 to 5,000 ft.
Distribution: Malaya, and N. Hindustan ascending to 10,000 ft.

L egenolfioides, Baker, So named by him in a letter—I have not yet seen his description. Mt. Dulit, Sarawak 5,000 ft. Mr. C. Hose 1892.

BLECHNUM. (Gen, xxxiv. Syn. Fil.)

B. serrulatum, Rich. (Syn. Fil. xxxiv. 14.) where "Borneo" is given as a habitat. I have not heard of it there.
Distribution: Malaya, New Caledonia, Australia, Florida, W. Indies, Guiana, Brazil.

B. orientale, Linn. (Syn. Fil. xxxiv. 15.) Common. Some of the fronds on a large plant are occasionally found in a beautiful bi-pinnate form in several places in Borneo.
Distribution: Australia and Polynesian Islands northward to S. China and the Himalayas.

B. Finlaysonianum, Wall. (Syn. Fil. xxxiv. 17.) Common.
Distribution: Malayan Peninsula.

ASPLENIUM. (Gen. xxxviii. Syn. Fil.)

§ *Thamnopteris.*

A. (*Thamn*) *Nidus*, L. (Syn. Fil. xxxviii. 1.) Common.
Distribution: Mauritius, Johanna Island, Seychelles, Malaya, Japan, Bonin, Chusan, Society Islands; New Caledonia, Queensland, Norfolk Island, Lord Howe's Island.

—— Var. *B. musæfolium*, Mett. Size as in Syn. Fil. but sori coming far short of the edge. Common.

—— Var. *Phyllitidis*, Don. Common.

§ *Euasplenium.*

A. microxiphion, Baker. (10*) Kew Bulletin, Feb. 1896, p. 40
Natuna Islands, Mr. Ernest Hose.

A. squamulatum, Bl. (Syn. Fil. xxxviii. 10.) Kuching and Niah and Mt. Lambir in the Baram district, Sarawak; North Borneo, Burbidge.
Distribution; Malaya and Philippines.

A. scolopendrioides, J. Sm. (Syn. Fil. xxxviii. 11.) "A fragment from Borneo exhibits the same raised line where the involucre bursts, but the stem is much longer." Syn. Fil. Not seen.
Distribution: Philippines.

A. Natunæ, Baker. (17*) Kew Bulletin, Feb, 1896. Natuna Islands, Mr. Ernest Hose.

A. longissimum, Bl. (Syn. Fil. xxxviii. 49). Banting, Sarawak.
Distribution: Malaya, Mauritius.

A. Wightianum, Wall. (Syn. Fil. xxxviii, 50). This was found in a quite typical form by Mr. A. H. Everett on the Natuna Islands.
Distribution: Madras, Ceylon.

A. vulcanicum, Bl. (Syn. Fil. xxxviii, 59). Mt. Matang, Lundu; Niah in the Baram district. Mr. Baker says of this form which is the same in the three places, "receding from the type towards the Ceylon *A. Wightianum*."
Distribution: Malay Peninsula and adjacent Islands.

A. tenerum, Forst (Syn. Fil. xxxviii, 61). On trees near the Samarahan River and elsewhere.
Distribution: Ceylon, Malaya, Polynesia.

A persicifolium, G. Sm. (Syn. Fil. xxxviii, 65). Sulu Islands, Mr. F. C. Burbidge. Kinabalu, 3,000 ft., Dr. G. D. Haviland.
Distribution: Philippines and Sandwich Islands.

A. fuliginosum, Hk. (Syn. Fil. xxxviii, 67). Borneo, Sir Hugh Low. Not seen by me.

A. borneense, Hk. (Syn. Fil. xxxviii, 68), North Borneo, Sir Hugh Low, and Dr. G. D. Haviland.
Distribution: Perak, Malay Peninsula.

A. hirtum, Kaulf. (Syn. Fil. xxxviii, 78). Sandakan, North Borneo. This is the *A. pellucidum*, Lam, in Cesati's Fil. Becc. Born. p. 20.
Distribution: Mauritius, Seychelles; Malaya: Hongkong and Philippines: Ladrones and Solomon Islands.

A. falcatum, Lam. (Syn. Fil. xxxviii, 94). Sulu Archipelago, Mr. F. C. Burbidge. Niah Sarawak.
Distribution: Malaya, Ceylon, Indian Peninsula, Polynesia, Australia, New Zealand; Mascaren Islands, Zambesi Land.

A. caudatum, Forst. (Syn. Fil. xxxviii, 95). North Borneo, Mr. F. C. Burbridge.
Distribution, Malaya, Hindostan; Polynesia, Australia: Comoros, Angola, Ecuador: Brazil.

A. macrophyllum, Sw., (Syn. Fil. xxxviii, 97). Mt. Matang, Lundu, Paku, etc. Sarawak.
Distribution, Malaya, Himalayas, Neilgherries; Hongkong; Polynesia; Mauritius; Johanna Island.

A. resectum, Sm. (Syn. Fil. xxxviii, 102). Mt. Matang, Niah, etc. Sarawak. "*A. unilaterale*, Lam. is an older name for this species" Baker in *New Ferns* Ann. Bot. Vol. v. 1891. Distribution: Malaya, Himalayas and Japan southward to Ceylon, Oahu and Fiji; Mauritius, Seychelles, Bourbon, Angola, Guinea coast.

A. heterocarpum, Wall. (Syn. Fil. xxxviii, 104). Said in Syn. Fil. to have been found in Borneo; locality not given. Distribution: Himalayas to Ceylon; Malay Peninsula; S. E. China.

A. subaquatile, Cesati, in Fil. Becc. Born. (107*). First found by Beccari in the Rejang River. I have seen it in the Sarawak, Undop, Skerang, Saribas, and Krian Rivers. It grows on the trunks of trees overhanging the stream, generally on the side which faces up-river, not far above the the water. Cesati considered it to belong to the § *Darea*. Baker by giving it his number 107* in *New Ferns* Ann. Bot. Vol. v. 1891, places it here.

A. cuneatum, Lam. (Syn. Fil. xxxviii, 124). North Borneo, Mr. F. C. Burbidge; Natuna Islands Mr. A. H. Everett. Distribution: Tropical America; Polynesian Islands; Malaya; Cape Colony to Mozambique, Johanna Island, Seychelles, Bourbon.

A. affine, Swartz. (Syn. Fil. xxxviii, 126). North Borneo; Mt. Matang and Niah, Sarawak. This is *A. spathulinum*, G. Sm. in Cesati Fil. Becc. Born. p. 20.
Distribution: Tropical America, West Indies to Brazil; Polynesia; Java, Malay Peninsula; Hongkong; Cape Colony to Mozambique, Bourbon, Johanna Island, Seychelles.

A. nitidum, Swz. (Syn. Fil. xxxviii, 127). Common. The stem is invariably ebeneous and glossy in the Malayan plant, not "greyish" as in Syn. Fil. This is *A. polystichoides*, Bl. in Cesati Fil. Becc. Born. p. 20.
Distribution: Malaya, Ceylon, North of India.

A. laserpitiifolium, Lam. (Syn. Fil. xxxviii, 128). North Borneo, Mr. F. C. Burbidge and Dr. Haviland.
Distribution : Polynesian Islands and northward to Chusan and Assam.

§ *Darea.*

A. (Dar) dichotomum, Hooker, (Syn. Fil. xxxviii, 160). Mt. Kinabalu, North Borneo, 5,000 ft. by Sir Hugh Low, Mr. F. C. Burbidge, and by Dr. Haviland. A specimen brought by the last corresponds with the description in Syn. Fil. excepting that the *ultimate segments* are *not* $1\frac{1}{2}$ to 2 lin. l. and $\frac{1}{4}$ in. broad! Probably there is a printer's error here.

A. (Dar.) Belangeri, Kunze, (Syn. Fil. xxxviii, 168). Mt. Matang and Niah, Sarawak: Sulu, Mr. Burbidge.
Distribution : New Guinea and the Philippines.

§ *Diplazium.*

A. (Dipl.) porphyrorachis, Baker in Jour. Bot. 1879. p. 40. Sarawak and North Borneo. Called A. *(Dipl) zeylanicum*, Hooker, in Cesati Fil. Becc. Born. This is *Polypodium subserratum* Hk. of Syn. Fil. named from an immature, sterile plant gathered by Wallace.

A. (Dipl.) pallidum, Bl. (Syn. Fil. xxxviii, 205). Sulu Islands, Mr. F. C. Burbidge.
Distribution : Malaya, Philippines.

A. (Dipl.) æquibasale, Baker in Jour. Linn. Soc. xxii, p. 225. (205*) Banks of the Sarawak and Undop Rivers.

A. (Dipl.) porrectum, Wall. (Syn. Fil. xxxviii, 206) Common in Sarawak and N. Borneo.
Distribution : Malaya.

A. biseriale, Baker (209*) Linn. Soc. Trans. iv. p. 252. — Mt. Kinabalu 3,000 ft. Dr. Haviland.

A. (Dipl) xiphophyllum, Baker in Jour. Bot. 1879 p. 40. (207*) First discovered by Mr. F. C. Burbidge in North Borneo. I have since found it in Perak, Malay Peninsula.

A. (Dipl) bantamense Baker. (Syn. Fil. xxxviii. 210.) Banting.

Matang, Lundu and other places in Sarawak.
Distribution: Malaya, Himalayas, Hongkong, Aneiteum.

A. (*Dipl.*) *sylvaticum*, Presl. (Syn. Fil. xxxviii. 207.) Borneo is given as a habitat of this Fern in Syn. Fil. I have not met with it there.

A. (*Dipl.*) *tomentosum*, Hk. (Syn. Fil. xxxviii. 224.) Not uncommon on the hills of Sarawak generally.
Distribution: Malaya, Khasia.

A. (*Dipl.*) *sorzogonense*, Presl. (Syn. Fil. xxxviii. 233.) Mt. Dulit, Sarawak. Mr. C. Hose.
Distribution: Malaya, Himalayas, Philippines.

A. (*Dipl.*) *crinitum*, Baker in Jour. Linn. Soc. xxiv. 258. Lingga Mountain, Paku, and Niah, Sarawak. This is the Fern which was described as A (Dipl.) *sorzogonense. var. Majus* Hk. from a specimen sent home by Lobb.

A. (*Dipl.*) *polypodioides*, Mett. (Syn. Fil. xxxviii. 244.) Saribas River, Sarawak and elsewhere.

A. (*Dipl.*) *maximum*, Don. (Syn. Fil. xxxviii. 246.) This Fern which in *New Ferns* Ann. Bot. Vol. v. 1891 Mr. Baker seems disposed to place under *A. latifolium*, Don. as Beddome does, is both in the Malay Peninsula and Borneo exceedingly different from the latter fern as represented in the specimens sent to me from the Himalayas and Ceylon. The Malayan Fern is well described in Syn. Fil. excepting that the limits of its dimensions should be extended in both directions. I have specimens with the secondary pinnae 5 in. long by $1\frac{1}{8}$ in. broad cut half-way down into rounded sub-falcate lobes; and others in which they are $1\frac{1}{2}$ in. long by $\frac{1}{4}$ in. broad with edges merely serrate. It is common on the hills of Sarawak.
Distribution: Malaya, Ceylon to North India.

A. (*Dipl.*) *sp.* A Fern found on Matang which I have twice sent to Kew (No. 74) and which is placed by Mr. Baker under *A. maximum*, Don. seems to me to be a very distinct species. The following is a description of it. Stipes tufted 2 or

more feet long with rather broad pale-brown scales at the base, otherwise naked, pale green when living, as is the whole frond. Frond 1½ to 3 ft. long, 1 ft. broad in the middle, tripinnatifid, the lowest pinnæ much the longest, up to 1 ft. but curved and ascending, so that in general outline the frond is elliptical rather than deltoid. Pinnules 1 to 2 in. long falcate unequal-sided, acute, the lower side narrowed very gradually towards the base, and therefore much curved, entire, or crenate in the upper part; the upper side narrowed suddenly, auricled, the base parallel with the rachis, beyond the auricle cut down about ⅓ into rounded finely serrate lobes. Veins pinnate in the lower part, simple in the upper. Sori fine reaching neither the midrib nor the edge.

The whole fern is, when living, very flaccid and herbaceous differing in this respect as well as in the form of of the whole frond and of its several parts from the robust habit of *A. maximum.* I have named it provisionally *A. (Dipl.) Matangense.*

A. (Dipl.) vestitum, Presl. (Syn. Fil. xxxiii. 248.) Borneo, fide Moore, as stated by Cesati in Fil. Becc. Born. p. 22.
Distribution: Philippines.

A. (Dipl.) Blumei, Bergsm. This is in Cesati's list, but I do not know it.

A. (Dipl.) latifolium, Don. (Syn. Fil. xxxviii. 249.) Found by Burbidge in N. Borneo, see Baker in Jour. Bot. 1879. p 41.
Distribution: Ceylon and Neilgherries; Sumatra; Philippines; S. China.

A. (Dipl.) latifolium, Don. "Variety" Baker. This I have found only once, on Lingga Mountain in Sarawak. It has pinnæ 1½ ft. long, 5 in. wide at the base, pinnatifid at the apex, and below that 12-15 pairs of nearly opposite, stalked, deltoid-lanceolate pinnules, 2 in. l. by ¾ in. broad cut down nearly to the base into oblong, or slightly falcate segments, the lower ones crenate on the upper side. I think it is probably a distinct species.

§ *Anisogonium.*

A. (Aniso.) cordifolium, (Syn. Fil. xxxviii, 266.) Banting, Mt. Matang and elsewhere in Sarawak.
Distribution : Malaya and Philippines.

——Variety. A. (Aniso.) *integrifolium* Bl. and other forms connecting this and *A. lineolatum* Banting, Sarawak.

A. (Aniso.) lineolatum Mett. (Syn. Fil. xxxviii, 268.) Banting. Sarawak. This is the *A. elegans* Mett. of Cesati in Fil. Becc. Born.
Distribution : Malaya, Philippines.

A. (Aniso). decussatum, Sw. (Syn. Fil. xxxviii. 270). The Limbang River and the Baram district, Sarawak ; = *A. proliferum*, Lam. a very good name as it is chiefly propagated by little bulbules, which are formed in the axils of the pinnæ, and in due time fall off and take root.
Distribution : Malaya, Polynesia, Queensland, Mascaren Islands, Angola, Guinea Coast.

A. (Aniso.) esculentum. Presl. (Syn. Fil. xxxviii 274.) Common. Much used as an article of food. It is the "*Paku amai*" = *Filix vera*, of the Dyaks.
Distribution : Malaya, Ceylon to Himalayas, Hongkong, Formosa.

TRIPHLEBIA. (Gen. xli* Syn. Fil.)

A new genus taken out of Scolopendrium, described by Baker in *New Ferns* Ann. Bot. Vol. v. 1891.

T. longifolia Baker. in Malesia III. 41 = *Scolopendrium longifolium* Presl. Niah, Sarawak, Mr. C. Hose.
Distribution : Philippines.

DIDYMOCHLŒNA)Gen. xlii. Syn. Fil.)

D. lunulata Desv. (Syn. Fil. xlii. 1.) The Western side of Mt. Matang, Sarawak at 1,000 ft.
Distribution : Throughout the Tropics of both hemispheres.

D. polycarpa, Baker. (Syn. Fil. xlii.2). Not uncommon just above the low lands Sarawak. I give this Fern the place it holds in Syn. Fil. but agree with Col. Beddome that its proper place is in the genus *Nephrodium*; see his *Supplement to the Ferns of British India p. 74.*
Distribution: Malaya.

ASPIDIUM. (Gen. xliii, Syn. Fil.)

§ *Polystichum.*

A. (*Polyst.*) *semicordatum*, Sw. (Syn. Fil. xliii. 4.) Mt. Matang and the Baram district, Sarawak.
Distribution: Malaya; Philippines; Tropical America from Cuba and Panama to Brazil and Peru.

A. (*Polyst.*) *aculeatum*, Sw. (Syn. Fil. xliii. 18). North Borneo, Mr. F. C. Burbidge, Kinabalu Dr Haviland.
Distribution: Throughout the world.

A. (*Polyst.*) *aristatum*, Sw. (Syn. Fil, xliii. 37). Lingga Mountain, Sarawak.
Distribution: Japan and Himalayas to Ceylon: N. S. Wales, Norfolk Island, Fiji, Samoa; Natal.

—— Var. *Hamiltonii*, Spr. (Syn. Fil. xliii, under 37). Mts. Matang and Santubong, Sarawak.

§ *Euaspidium.*

A. platanifolium, Mett. (Syn. Fil. xliii, 50). Mt. Matang, and Lundu, Sarawak.
Distribution: Malaya.

A repandum, Willd. (Syn. Fil. xliii. 53). Pulo Gaya, Pulo Banggi and Limestone districts of the Upper Sarawak River,
Distribution: Philippines.

A. membranaceum, Hk. (Syn. Fil. xlii. 55). At the mouth of Limestone caves, Sarawak.
Distribution: Ceylon, Java, Philippines, W. China Formosa.

NEPHRODIUM. (Gen. xliv. Syn. Fil.)

§ *Lastrea.*

N. (Last.) *gymnopodum*, Baker, Trans. Linn. Soc. No. iv, p. 249 (17 *). Mt. Kinabalu 10,500 ft. Dr. Haviland.

N. (Last.) *immersum*, Hk. (Syn. Fil xliv. 23.) Lundu and Upper Sarawak.
Distribution: Malaya, Assam, Philippines, N. Caledonia.

N. (Last.) *calcaratum*, Hk. (Syn. Fil. xliv. 29.) Mt. Matang, and Mt. Dulit, Sarawak.
Distribution: Malaya, Ceylon to N. India, Philippines, Hongkong.

N. (Last.) *viscosum*, Baker (Syn. Fil. xliv. 30.) Found in Borneo by T. Lobb. locality not given.
Distribution: Malacca, Perak, Philippines.

N. (Last.) *Creaghii*, Baker in Kew Bulletin for September 1898, p. 280 (35*). British North Borneo by Mr. C. V. Creagh.

N. (Last.) *crassifolium*, Hk. (Syn. Fil. xliv. 40.) Mt. Matang, Sarawak.
Distribution: Malaya, Philippines.

—— var. *Motleyanum*, Hk. M. S. S. (Syn. Fil. in a note to the last sp.) Found on Matang. This form is invariably larger, and coarser than the type.

N. (Last.) *Beccarianum*, Cesati, Fil. Becc. Born. p. 23. (40 *.) Mt. Matang by Beccari, and Mt. Dulit by Mr. C. Hose.

N. (Last.) *echinatum*, Baker (Syn. Fil. xliv, 41.) Said to have been found in Borneo by Korthals. (Syn. Fil.) Not seen by me.

N. (Last.) *polytrichum*, Baker in Jour. Bot. 1891, p. 107. (41*). On Lingga Mountain and on Mt. Dulit.

N. (Last.) *borneense*, Hooker (Syn. Fil. xliv, 81.) Paku, Upper Sarawak.

N. (Last.) *sparsum*, Don. (Syn. Fil. xliv. 94.) Mt. Dulit, Sarawak.
Distribution: Malaya, Ceylon to N. India, China, Mauritius

N. (Last.) *dissectum*, Desv. (Syn. Fil. xliv, 126.) Limestone districts, Sarawak, Jambusan and Niah.

Distribution: Malaya, Ceylon to N. India, Philippines to Samoa, S. W. Australia, Madagascar.

N. (Last.) *sarawakense*, Baker in Jour. Linn. Soc. xxii. p. 225. (131 *.) Banks of the Sarawak and Undop Rivers.

N. (Last.) *aciculatum*, Baker, Jour. Linn. Soc. xxii. p. 226 (131*.) Mt. Matang, Sarawak, common there, not seen elsewhere.

N. (Last.) *setigerum*, Baker (Syn. Fil. xliv, 139.) Kuching and Lundu, Sarawak.
Distribution: Ceylon to N. India, Malaya, China, Japan, Polynesia.

N. (Last.) *multisetum*, Baker, Jour. Linn. Soc. xxii. p. 226 (139*), Mt. Matang, Sarawak, 2,000 ft. A beautiful Fern exceedingly rare.

N. (Last.) *megaphllyum*, Baker, Jour. Linn. Soc. xxii. p. 227. Sebetan River, Sarawak, epihytal. Found also in Perak, Malay Peninsula.

§ *Eunephrodium.*

N. unitum, B. Br. (Syn. Fil. xliv. 162.) Sarawak, not common there.
Distribution: Tropical regions and somewhat beyond them, all round the world.

N. oosorum, Baker, Kew Bulletin Feb., 1896 p. 41 (168*). Pulo Gaya, N. Borneo.

N. pteroides, J. Sm. (Syn. Fil. xliv. 164.) North Borneo by Mr. Burbidge.
Distribution: Malaya, Ceylon to Himalayas, Philippines, China, Queensland, Polynesia.

N. procurrens, Baker, (Syn. Fil. xliv.) very common. Doubtfully distinct from *N. molle*, Desv.
Distribution, Throughout Malaya.

N. cucullatum, Baker, (Syn. Fil. xliv. 171.) Common.
Distribution: Malaya, Ceylon to N. India, Mascaren Islands, Fiji.

N. Hœnkeanum, Presl, (Syn. Fil. xliv. 172.) North Borneo and Lundu, Sarawak.
Distribution, Malaya, Ceylon, Fiji.

N. glandulosum, J. Sm. (Syn. Fil. xliv, 177.) Banting, Sarawak = N. lineatum, Mett.
Distribution, Malaya, Assam, Philippines.

N. Arbuscula, Desv. (Syn. Fil. xiiv, 179.) Banks of the Sarawak River. "A large variety." Baker.
Distribution, Ceylon, Neilgherries, Mascaren Islands. Amboynay, Philippines, Solomon Island.

N. simulans, Baker in Jour. Bot. 1888 p. 325 (182*) Limestone districts Sarawak. *e. g.* Paku and Niah. Mr. Baker has so named this new species, perhaps forgetting that he had given the same specific name to his *Nephrodium* (*Sagenia*) *simulans*. = *Pleocnemia Thwaitesii*. Beddome, F. B. I. p. 223.

N. hispidulum, Baker (Syn. Fil. xliv 186.) Mt Gading, Lundu, Sarawak.
Distribution, Malaya, Philippines.

N. molle, Desv. (Syn. Fil, xliv 187) Niah, Sarawak, Mr. C. Hose. Stipes decidedly tufted, as in the description, and so differing from the common form *N. procurrens* Baker.
Distribution: Himalayas to Ceylon, Malaya, Hongkong, Australia, New Zealand; Mascaren Islands, Cape Colony, Guinea Coast and W. African Islands; Cuba and Mexico to Peru and Brazil.

N. heterocarpon. Moore, (Syn. Fil. xliv, 188.) Kuching and Matang, Sarawak.
Distribution: Malaya and Hongkong.

N. ferox, Moore. (Syn. Fil. xliv, 192.) Matang, Sarawak 2,000 ft. The Sarawak form is typical excepting that the hairs on the stipe are always brown instead of black. In the

Malay Peninsula they are often black as described in Syn. Fil.

Distribution: Malay Peninsula, Java, Kumaon, Philippines, Celebes.

N. truncatum, Presl. (Syn. Fil. xliv, 194.) Saribas, Matang, Baram District, Sarawak.
Distribution: Malaya, Ceylon to N. India, Australia, Polynesia.

§. *Pleocnemia.*

N. (Pleoc.) Leuzeanum, Hooker, (Syn. Fil. xliv, 200.) Common in Sarawak. Island of Balabac.
Distribution: Malaya, N. India, Hongkong, Philippines, Samoa, Fiji.

§. *Sagenia.*

N. (Sag.) singaporeanum, Baker (Syn. Fil. xliv, 201.) Mt. Matang, Sarawak 1,000 ft.
Distribution: Malaya.

N. (Sag.) pteropodum, Baker, Jour. Bot. 1888, p. 325 (201*) Mt Matang, and elsewhere in the Baram district, Sarawak. I am doubtful whether this is not a simple form of *N.* (*Sag.*) *vastum*, Baker.

N. (Sag.) ternatum, Baker, (Syn. Fil. xliv. 202.) Banting. Sarawak, and N. Borneo (Burbridge).

N. (*Sag.*) *Everettii*, Baker, Kew Bulletin Feb. 1896, p 41. (202*) Natuna Islands, Mr. A. H. Everett.

N. (*Sag.*) *vastum*. Baker (Syn. Fil xliv. 203). Mt. Matang, Mt. Lambir in the Baram district, Sarawak.
Distribution: Malaya, Himalayas.

N. (*Sag.*) *melanocaulon*, Baker (Syn. Fil. xliv. 204). by Mr. Burbridge in Sulu.
Distribution: Malaya, Himalaya, Philippines.

N. (Sag.) Lobbii, Baker (Syn. Fil. xliv 207) Banks of the Sarawak River. First found by Lobb.

N. (Sag.) subdigitatum, Baker, Jour. Linn. Soc. xxiv, p. 259. Niah in the Baram District, Sarawak.

N. (Sag.) *semibipinnatum*, Baker, (Syn. Fil. xliv. 208.) On a branch of the Sarawak river near Quop. Here as elsewhere just where the river water ceases to be salt.
Distribution : Malay Peninsula and adjacent Islands.

N. (Sag.) *polymorphum*, Baker, (Syn. Fil. xliv. 211.) Common in Sarawak, and North Borneo.
Distribution : Malaya ; Ceylon to Himalayas.

N. (Sag.) *decurrens*, Baker (Syn. Fil. xliv. 217.) Mt. Matang and the banks of the Sebetan River.
Distribution : Malaya, Ceylon to N. India ; Philippines ; Formosa ; Aneiteum and Samoa.

N. (Sag.) *Hosei*, Baker (219 *) so re-named by Baker in *New Ferns* Ann. Bot Vol,v. 1891=N. stenophyllum, Baker, Jour. Linn. Soc. xxii p. 227 ; tab. 11 (non Jour. Bot. 1884 p. 363.) River Banks of the Undop and Krian Rivers, Sarawak.

N. (Sag.) *nudum*, Baker, Jour. Bot. 1879, p. 41 (219 *). Found in N. Borneo by Mr. Burbidge.

N. (Sag.) *melanorachis*, Baker, Jour. Bot. 1888, p. 325. (221 *) Near the Jambusan limestone caves, Upper Sarawak and at Niah.

NEPHROLEPIS (Gen. xlv. Syn. Fil. p. 300.)

N. exaltata, Schott. (Syn. Fil, xlv. 2.) Banks of the Krian River, Sarawak.
Distribution : N. India to Ceylon ; Malaya ; Chusan to Queensland ; Polynesia ; Mauritius, Angola, Zambesi Land, Guinea coast ; Cuba, the Bahamas and Mexico to Peru and Brazil.

N. volubilis, J. Sm. (Syn. Fil. xlv. under 2 ; see *New Ferns* Ann. Bot. Vol. v. 1891 *Baker*.) Kuching, and Lundu, Sarawak.
Distribution : Malay Peninsula and adjacent islands.

N. acuta, Presl. (Syn. Fil. xlv. 3.)
Distribution : Almost the same as N. exaltata. A pretty

bipinnatitid form of this Fern introduced into Singapore by the late Sultan of Johore from Kew, and thence into Kuching by me about 15 years ago, has become almost naturalized in the neighbourhood of the chief settlements.

OLEANDRA. (Gen. xlvi. Syn. Fil. p. 302.)

O. bantamensis, Kze. Described by Cesati in Fil. Becc. Born. p. 24. Banting, Sarawak, by Beccari.

O. neriiformis, Cav. (Syn. Fil. xlvi. 1.) Kuching, Sarawak.
Distribution: Malaya, N. India, Philippines, N. Guinea; Fiji, Samoa, Aneiteum; Guinea Coast; N. Granada and Guiana to Brazil and Peru.

—— Var. *phyllarthron*, Kze. (Syn. Fil. xlvi. under 1.) Santubong, Sarawak.

—— Var *brachypus*, Hook, Ces. Fil. Becc. Born. p. 24. Banting, Sarawak, by Beccari.

O. musæfolia, Cav. (Syn. Fil. xlvi. 2.) Gunong Ayer, Sarawak.
Distribution: Malaya, Ceylon.

TRIBE II. POLYPODIEÆ.

POLYPODIUM. (Gen. xlviii. Syn. Fil. p. 304.)

§ *Euphegopteris.*

P. (Pheg.) *oxyodon*, Baker, Jour. Bot. 1879 p. 66. (27 *) Sulu Islands, by Burbidge.

P. (Pheg.) *subarboreum*, Baker, Jour. Linn. Soc. xxiv. p. 259 (50 *) Niah in the Baram District, Sarawak.

§ *Goniopteris.*

P. (Goniopt.) *holophyllum*, Baker, Jour. Bot. 1888, 325. (57*) Niah Sarawak.

P. (*Goniopt.*) *borneense*, Hooker. (Syn. Fil. xlviii. 59.) "Borneo" locality not given. Collected by Lobb, and not since met with.

P. (*Goniopt.*) *urophyllum*, Wall. (Syn. Fil. xlviii. 64.) Common in Sarawak, and British North Borneo. Beddome transfers this species to Nephrodium.
Distribution: Malaya, Ceylon to N. India, Chusan, Aneiteum and Queensland.

P. (*Goniopt.*) *firmulum*, Bk. Kew Bulletin, Aug. 1893 (64*) Mt. Dulit, Sarawak.

§ *Dictyopteris.*

P. (*Dicty.*) *Barberi*, Hk. (Syn. Fil. xlviii. 81.) Mt. Matang, Mt. Lambir in the Baram District, Sarawak: Pulo Gaya in North Borneo. This should be placed among the *Sagenias.*
Distribution: Malaya.

P. (*Dicty.*) difforme, Mt. Matang and Bl. (Syn. Fil. xlviii. 88) the Baram District. This too is a *Sagenia.*
Distribution: Malaya.

§ *Eupolypodium.*

P. minimum. Bk. Jour. Bot. 1879, p. 41 (91*). First found by Burbidge in N. Borneo, afterwards by me on Mt. Matang.

P. congener. Hk. = *Grammitis congener*, Bl. Fil. Jav. tab. 46, fig 3. See Baker. *New Ferns* Ann. Bot. Vol. v. 1891. (99*) Mt. Dulit, Sarawak.
Distribution: Java and Sumatra.

P. (*Grammitis*) *bisulcatum*, Hooker, (Syn. Fil. xlviii. 104.) "Borneo," locality not given. Discovered by T. Lobb. I have not seen it.

P. (*Grammitis*) *gramineum*, Sw. (Syn. Fil. xlviii. 105.) Mt. Tiang Laju, Batang Lupar district, Sarawak, by Beccari recorded by Cesati in Fil. Becc. Born. p. 24 but not repeated by Beccari himself in his Felcidi Borneo, Malesia Vol III.
Distribution: West Indies, Guiana.

P. (*Grammitis*), *Havilandi*, Bk. Jour Linn. Soc. iv. p. 253. (107*.) Mt. Kinabalu, N. Borneo 10,500 ft. by Dr. Haviland.

P. (*Grammitis*) *sessilifolium*, Hk. (Syn. Fil. xlviii. 109.) Mt. Gading, Sarawak, quite at the top 2,000 ft. (See below.)
Distribution: Philippines and Malaya.

[*P.* (*Grammitis*) *Maxwellii*, Baker. Kew Bulletin Aug. 1896 p. 211. Col. Beddome informs me that he pointed out to Mr. Baker that it is really identical with small specimens of *P. sessilifolium*, Hooker; and that Mr. Baker on making the comparison agreed with him.]

P. flabellivenium, Baker. (Syn. Fil. xlviii. 112.) Mt. Lingga and Mt. Dulit, Sarawak; and N. Borneo by Burbidge. First collected by Signor Beccari.

P. alternidens, Cesati, Fil. Becc. Born. p. 25, tab, 2. fig. 4. (119*). Mt. Matang, Sarawak. Found first by Beccari, and afterwards in N. Borneo by Burbidge.

P. cucullatum, Nees (Syn. Fil. xlviii. 121.) "Borneo" without precise locality by Low, and afterwards by Dr. Haviland on Mt. Kinabalu at 10,500 ft.
Distribution: Malaya, Ceylon, New Guinea, Philippines, Polynesia.

[*P. subserratum*. Hk. (Syn. Fil. xlviii. 129.) So named by Hooker from a specimen without fruited fronds discovered by Wallace, turns out to be an Asplenium, A. (Dipl.) porphyrorachis, Baker, which see.]

P. barathrophyllum, Baker. Jour. Bot. 1891 p. 107 (129*) Mt. Mulu.
Distribution: Perak, Malay Peninsula.

P. decipiens, Mett. (Syn. Fil. xlviii. 130* p. 508.) "Borneo" locality not given, nor collector's name. Cesati says Korthals in Fil. Becc. Born. p. 25. Not seen by me.

P. Burbidgei, Baker, Jour. Bot. 1879. p. 42. (131*) Lawas River, North Borneo by Burbidge.

P. streptophyllum. Baker, Jour. Bot 1879 p. 42. (132*) North Borneo by Burbidge, and on Mt. Dulit, Sarawak.
Distribution: Singapore.

P. repandulum, Mett. (Syn. Fil. xlviii. 149). Mt. Matang and Mt. Gading, Sarawak.
Distribution : Ceylon.

P. minutum, Bl. (Syn. Fil. xlviii, 151). North Borneo by Burbidge.
Distribution : Malay Isles, Ceylon, Philippines.

P. celebicum, Bl. (Syn. Fil. xlviii, 160). "Borneo," locality and collector not given. Not seen by me.
Distribution : Celebes, Sumatra.

P. decorum Brack. (Syn. Fil. xlviii, 168). Santubong, Matang, Quop and Mt. Lambir, Sarawak.
Distribution : Malaya, Ceylon, Philippines to Tahiti and Sandwich Islands.

P. nutans. Bl. Fil. Jav. tab. 86 A : Baker in Jour. Bot. 1880, 214. (168*) Noticed in Syn. Fil. under P. decorum but now recognized as specifically distinct. Mt. Dulit, Sarawak.
Distribution : Java and Sumatra.

P. blechnoides. Hook. (Syn. Fil. xlviii. 169). Borneo without specifying locality : Kinabalu, 10,500 ft. by Dr. Haviland.
Distribution : Polynesia, Queensland.

P. Lobbianum, Hk. Syn. (Fil. xlviii, 170). Borneo, no locality given, by Thomas Lobb. I have not seen it.

P. papillosum, Bl. (Syn. Fil. xlviii, 174). Mt Matang on the western slope. North Borneo by Burbidge.
Distribution : Perak, Malay Peninsula ; Java ; Philippines.

P. Cesatianum, Baker. Jour. Bot. 1879. p. 24. (175*) described as *P. papillosum* Bl. by Cesati in Fil. Becc. Born. ; Mt Matang by Beccari, N. Borneo by Burbidge.

P. Leysii, Baker Jour. Bot. 1879. p. 66 (175*). Found by Mr. Burbidge in the Sulu Islands, not elsewhere as yet.

P. clavifer, Hk. (Syn. Fil. xlviii, 187). Collected by Sir Hugh Low in Borneo ; no locality given.
Distribution : New Guinea.

P. taxodioides, Baker, Bot. Jour. 1879. p. 42. (210*) N. Borneo by Burbidge; "An endemic species," Baker in Jour. Linn. Soc. No.

§ GONIOPHLEBIUM.

P. (*Gonioph*) *verrucosum*, Wall. (Syn. Fil. xlviii, 252). Common in Sarawak.
Distribution: Malaya, New Guinea, Philippines, Queensland.

§ NIPHOBOLUS.

P. (*Niph*) *adnascens*: Sw. (Syn. Fil. xlviii, 278). Common in Sarawak: often bipinnatifid.
Distribution: Malaya, Ceylon to N. India; Fiji, Mascaren Islands, Cameroon Mountains.

P. (*Niph*) *acrostichoides*. Forst. (Syn. Fil. xlviii, 279). At Paku in Upper Sarawak.
Distribution: Malaya, Ceylon, Philippines, New Hebrides, Queensland.

P. (*Niph*). *Heteractis*, Mett. and Kuhn. Linn. 36. p. 140 (See Syn. Fil. xlviii, 280 in Suppt p. 572). This is the large Himalayan form of *P.* (*Niph.*) *Lingua*, Sw. Sempadi River in the Batang Lupar district, Sarawak.
Distribution: North India and the Malay Isles.

P. (*Niph*) *nummulariæfolium*, Mett. (Syn Fil. xlviii, 285). Mt. Matang, Sarawak.
Distribution: Malaya, N. India, Neilgherries, Philippines.

§ PHYMATODES, PRESL. (including PLEOPELTIS.)

P. (*Phym*). *subecostatum*, Hk. (Syn. Fil. xlviii. 297). Paku on the Upper Sarawak River. First found by T. Lobb. His locality is not specified.

P. (*Phym*). *stenopteris*, Baker, Jour. Bot. 1879, p. 43 (297*, Found by Burbidge in N. Borneo near the Lawas River) and by me on Bukit Siol near Kuching, Sarawak.

P. (*Phym*) *accedens*, Bl. (Syn. Fil. xlviii, 298.) In the Baram District, Sarawak.

P. (*Phym.*) *oodes*, Kze (Syn. Fil. xlviii. 301.) N. Borneo by Burbidge; the Baram District, Sarawak.
Distribution: Philippines.

P. (*Phym.*) *stenophyllum*, Bl. (Syn. Fil. xlviii. 306.) Mt. Matang, and Mt Lambir and Mt Mulu, Sarawak.
Distribution: Malaya, Philippines.

P. (*Phym*). *soridens*. Hk. (Syn. Fil. xlviii. 307.) N. Borneo and Mt. Matang. Sarawak.

P. (*Phym.*) *sinuosum*. Wall. (Syn. Fil. xlviii. 308.) Kuching, Sarawak.
Distribution: Malaya, Amboyna, New Hebrides, Solomon Isles.

P. (*Phym.*) *longifolium*, Mett. (Syn. Fil. xlviii. 309.) Common in Sarawak.
Distribution: Malaya N. India. Philippines.

P. (*Phym.*) *Sarawakense*. Baker. Jour. Linn. Soc. xxii 2289 (311*.) Mt. Matang, Sarawak.

P. (*Phym.*) *angustatum*. Sw. (Syn. Fil. xlviii. 317.) Kuching, Sarawak.
Distribution: N. India, Malaya, Tahiti.

P. (*Phym.*) *myriocarpum*, Mett. (Syn. Fil. xlviii. 328.) "Borneo." No locality, or collector. Not seen by me.
Distribution: Philippines, Cochin-China.

P (*Phym.*) *linguæforme*, Mett. (Syn. Fil. xlviii. 329.) Niah in the Baram Residency, Sarawak.
Distribution: Amboyna, Solomon Islands, Admiralty Islands.

P. (*Phym.*) *campyloneuroides*, Baker. Jour. Linn. Soc. xxii. 229 (331*.) Mt. Matang, Sarawak, 2,000 ft. and Niah.

P. (*Phym.*) *costulatum*, Baker. Jour. Bot. 1880 p. 215. (333*) Mt. Dulit, Sarawak: Mt. Kinabalu by Dr, Haviland, = *Acrostichum costulatum* Cesati, Fil. Becc. Polyn. 8.
Distribution: Sumatra, New Guinea.

P. (*Phym.*) *leucophorum*, Baker, Jour. Linn. Soc. xxii. p. 229 (334*). Mt. Matang, Sarawak 2,500 ft. rare.

P. (*Phym.*) *rupestre*, Bli. (Syn. Fil. xlviii, 335.) Mt. Matang, Sarawak.
Distribution: Malay Peninsula, Java, Sumatra, Philippines.

P. (*Phym.*) *platyphyllum*, Sw. (Syn. Fil. xlviii, 337.) Mt. Matang; the Baram District, and Mt. Mulu, Sarawak.
Distribution: Malay Peninsula, Java.

P (*Phym.*) *membranaceum*, Don. (Syn. Fil. xlviii, 339.) Island of Balabac, off the coast of British North Borneo, by Mr. A. H. Everett.
Distribution: North India to Ceylon; W. China and the Philippines.

P. (*Phym.*) *heterocarpum*, Bl. (Syn. Fil. xlviii, 340). Said there to have been found in Borneo. I have not seen it.
Distribution: N. India, Ceylon, Java, Philippines.

P. (*Phym.*) *irioides*, Lam. (Syn. Fil. xlviii, 341). Around Kuching, Sarawak, common.
Distribution: N. India to Malaya; Chusan to Fiji; Isle of Pines and N. S. Wales; Mascaren Islands, Zambesi Land, Natal, Angola, Guinea Coast.

P. (*Phym.*) *musæfolium*, Bl. (Syn. Fil. xlviii, 342). Samarahan River, and Baram District, Sarawak.
Distribution: Malaya.

P. (*Phym.*) *Labrusca*, Hooker (Syn. Fil. xlviii, 346). On limestone hills near the Sarawak River, and in the Baram District, Sarawak. First found by T. Lobb.

P. (*Phym.*) *dulitense*, Baker in Kew Bulletin, Aug. 1893 p. 211 (346*). Mt. Dulit, Sarawak.

DIPTERIS.

P. (*Dipteris*) *Dipteris*, Bl. (Syn. Fil. xliii, 351) = Dipteris Horsfieldii, R. Br. Common in Sarawak from the sea-shore, and river-banks to 2000 ft.
Distribution : Malaya, Polynesia.

N. (*Dipt.*) *quinquefurcatum*, Baker. Jour. Linn. Soc. xxiv, 269. (352 *). A new species which I received from Mr. Forstermann in 1886. He discovered it somewhere inland of Bintulu, Sarawak : it has not been again observed.

P. (*Dipt.*) *bifurcatum*, Baker (Syn. Fil. xlviii, 353).= Dipteris Lobbiana, *Hk.* Found on the banks of most rivers in Sarawak and North Borneo at some distance above the highest point to which the influence of the tide extends.
Distribution : Malay Peninsula, Celebes.

P. (*Phym.*) *incurvatum*, Bl. (Syn. Fil. xlviii, 357). Mt. Matang and the Baram District, Sarawak.
Distribution : Malaya, Himalayas.

P. (*Phym.*) *Phymatodes*. L. (Syn. Fil. xlviii, 362.) Common in Sarawak.
Distribution : Malaya, Ceylon ; Tsus-Sima, Loo Choo, Formosa ; N. Australia ; Mascaren Islands, Natal, Zambesi Land, Angola, Guinea coast.

P. (*Phym.*) *nigrescens*, Blume, (Syn. Fil. xlviii, 368.) Quop, Mt. Matang, and in the Baram District, Sarawak.
Distribution : N. and S. India, Ceylon, Malaya, Fiji, Samoa, Friendly Isles.

P. (*Phym.*) *affine*, Bl. (Syn. Fil. xlviii, 364.) Paku, Upper Sarawak, a limestone district. Sori as yellow as those of *P. aureum* L. Distribution : Malaya, and Philippines.

P. (*Phym.*) *grandidentatum*, Baker in *New Ferns* Ann. Bot. Vol. v. 1891. (366 *). It is Cesati's *P. dilatatum* var. *grandidentatum*, Fil. Becc. Born. p. 27. Baker considers it specifically distinct. I have only found it at Banting, Sarawak, where it was discovered by Beccari.

P. (*Phym.*) *lacniatum*, Bl. (Syn. Fil. xlviii, 367.) Kinabalu at 10,500 ft. by Dr. Haviland.
Distribution : Java, Perak in the Malay Peninsula.

P. (*Phym.*) *lomarioides* (Syn. Fil. xlviii, 370). This fern Baker now puts in Blume's genus *Lecanopteris* which he has restored. *New Ferns* Ann. Bot. Vol. v. 1891. Dr. Christ in *Die Farnflora von Celebes* p. 161 discusses this change, which he is unable to accept.

P. (*Phym.*) *ebenipes*, Hk. (Syn. Fil. xlviii, 371.) North Borneo by Burbidge.
Distribution : N. India.

P. (*Phym.*) *longissimum*, Bl. (Syn. Fil. xlviii, 372.) By the Samarahan River, Sarawak, growing in swampy cleared land.
Distribution : N. India, Neilgherries, Malaya, Philippines, Formosa.

Drynaria.

P. (*Dryn*) *quercifolium*, L. (Syn. Fil. xlviii, 381.) Santubong, on trees along the coast ; Simanggang in the Batang Lupar district, Sarawak. Rare, the next species is the common form.
Distribution : Throughout the Indian region and Ceylon ; Malaya, S. China, Queensland.

P. (*Dryn*) *Linnæi*, Bory. (Syn. Fil. xlviii, 382.) Common in Sarawak and N. Borneo.
Distribution : Malaya, Ceylon, Queensland, Solomon Islands and Fiji.

P. (*Dryn.*) *rigidulum*, Sw. (Syn. Fil. xlviii, 383.) Lundu, Sarawak at about 1,000 ft.
Distribution : Malaya, Queensland, Fiji.
[Dr. Christ in *Die Farnflora von Celebes*, in giving the distribution of *P.* (*Drynaria*) *Heracleum*, Kze says "Borneo (Hose)." This is a mistake ; I sent him specimens

of this Fern, but they were from Perak. So far as I know it has not yet been found in Borneo.]

P. (*Phym.*) *palmatum*, Bl. (Syn. Fil. xlviii, 384) Sulu Islands by Burbidge.
Distribution : Malaya, Philippines.

P. (*Phym.*) *albido-squamatum*, Bl. (Syn. Fil. xlviii, 389.) Sulu Islands by Burbidge.
Distribution : Malay Islands, including New Guinea, and Philippines.

Tribe xii. Grammtideæ.

Monogramme (Gen. li. Syn. Fil. p. 374.)

M. dareæcarpa, Hk. (Syn. Fil. li. 1.) Labuan, Borneo, by Barber. Not seen by me.

M. trichoidea, J. Sm. (Syn. Fil. li. 4.) Niah in the Baram District, Sarawak.
Distribution : Malay Peninsula, Philippines.

Gymnogramme. (Gen. lii. Syn. Fil. p. 376.)

§. *Leptogramme.*

G. (*Lept.*) *Totta*, Schlecht. (Syn. Fil. lii. 3.) Quop, Sarawak.
Distribution : Malaya; Ceylon to Himalayas; Corea to Hongkong; Africa and its islands.

§. *Stegnogramme.*

G. (*Stegn.*) *aspidioides*, Hk. (non Kaulf.) (Syn. Fil. lii. 13.) Niah in the Baram District, Sarawak.
Distribution : Khasya, Ceylon, Java.

§. *Ceropteris.*

G. (*Cerop.*) *chrysosora*, Baker, Jour. Linn. Soc. xxiv, 260. (51*) See also Baker, *New Ferns*, Ann. Bot. Vol. v. 1891. New species, gathered by Mr. Forstermann in the country inland of Bintulu, Sarawak. Mr. Baker in the paper quoted above remarks that this appears to

form a section connecting *Eugymnogramme* with Ceropteris, the barren fronds being naked, while the fertile ones are coated with yellow waxy powder.

§ *Syngramme.*

G. (*Syn.*) *borneensis*, Hk. (Syn. Fil. lii. 58). Sarawak at Banting and on Mt. Matang; in N. Borneo at Sandakan, on the Bongaya River by Mr. Ridley, and elsewhere by Burbidge. First found by Lobb.

——— Var. *major*, Baker, Jour. Bot. 1879, p. 299. Banting, Sarawak.
Distribution: of this variety, Fiji.

G. (*Syn.*) *cartilagidens*, Baker, (Syn. Fil. lii. 59.) Banting, Sarawak, where it was first found by Signor Beccari. In that locality it grows together with *G. borneensis* which is quite typical; and in North Borneo there is a form which is clearly intermediate and I am inclined to doubt whether this ought to be retained as a distinct species.

G. (*Syn.*) *Lobbiana*, Hk, (Syn. Fil. lii. 61.) Matang, Sarawak.
Distribution: Perak, Malay Peninsula.

G. (*Syn.*) *Wallichii*, Hk. (Syn. Fil. lii. 63.) Kuching, Sarawak,
Distribution: Malay Peninsula and Singapore.

G. (*Syn.*) *alismæfolia*, Hk. (Syn. Fil. lii. 64.) Baram, Sarawak.
It is very doubtful whether this should be taken as a species distinct from *G. Wallichii* Hk.
Distribution: Malay Peninsula, Singapore, Philippines.

G. (*Syn.*) *valleculata*, Baker, Jour. Bot, 1888 p. 325 (64*.) A very distinct species. Mt. Lambir, Sarawak.

G. (*Syn.*) *quinata*, Hk. (Syn. Fil. lii, 65.) Lundu and Gunong Ayer, Sarawak.
Distribution: New Guinea, Vanecolla, Solomon Islands.

§ SELLIGUEA.

G. (*Sell.*) *involuta*, Hook. (Syn. Fil. lii, 69.) Mt. Matang, Sarawak.
Distribution: Malaya, Ceylon to Himalayas, Solomon Islands.

G. (*Sell.*) *avenia*, Baker, (Syn. Fil. lii. 70.) In the neighbourhood of Kuching, and at Miri in the Baram District, Sarawak.

G. (*Sell.*) *acuminata*, Baker, Jour. Bot. 1888, 326 (71*). Lobang on the Samarahan River, and in the Baram District, Sarawak.

G. (*Sell.*) *campyloneuroides*, Baker, Jour. Linn. Soc. xxiv. 261 (71*.) Mt. Matang, and the Baram District, Sarawak.
Distribution: Perak, Malay Peninsula.

G. (*Sell.*) *regularis*, Baker, (Syn. Fil. lii. 73.) Said there to have been found in Borneo by Korthals; I have not met with it.

G. (*Sell.*) *macrophylla*, Hooker, (Syn. Fil. lii. 74.) On Mt. Matang, and in the Baram District, Sarawak.
Distribution: Malaya to New Guinea and Philippines.

G. (*Sell.*) *Feei*, Hooker, (Syn. Fil. lii. 76.) Common in Sarawak. There is a form often met with, in which the barren and fertile fronds are alike, both larger than the type. I supposed this to be Blume's *G. vulcanicum*, but it is not recognized as such at Kew.
Distribution: Malaya.

MENISCIUM. (Gen. liv. Syn. Fil. p. 390.)

M. triphyllum, Sw. (Syn. Fil. liv, 3.) Mt. Gading, Lundu Sarawak.
Distribution: Malaya, Ceylon to the Himalayas, S. China.

M. Hosei, Baker, Jour. Linn. Soc. xxii, 230. (4.*) On the banks of the rivers Undop, Krian and Saribas, and at Lundu, Sarawak. Near *M. Thwaitesii* Hk.

M. stenophyllum, Baker, Jour. Bot. 1891, p. 108. (4*.) In the Baram District, Sarawak (Mt. Mulu?)

M. cuspidatum, Bl. (Syn. Fil. liv. 9.) Banting and Lundu, Sarawak

Distribution: Malaya, N. India, Philippines. Both Syn. Fil. and Col. Beddome raise the question whether this fern and *Pol.* (*Goniopt:*) *urophyllum* are not the same. Beddome says they are very much mixed up in all Herbaria. That is likely to be the case, but the great resemblance only begins when both are dried. When living and growing the difference is unmistakeable. It is perhaps most noticeable in the matter of texture; the *Meniscium* is soft, rather thick, and leathery. The *Goniopteris* is crisp, thin, and papery. It is probable enough that both are Nephrodiums with involucres very fugitive, or, more commonly, suppressed.

ANTROPHYUM. (Gen. lv. Syn. Fil. p. 392.)

A. subfalcatum, Baker, (Syn. Fil. lv. 2), where it is said to be found in "Borneo." Not seen by me.
Distribution: Fiji, Samoa.

A. parvulum, Bl. (Syn. Fil. lv. under 5, A plantagineum, Kaulf.) Mt. Gading, Lundu, Sarawak.

A. reticulatum, Kaulf. (Syn. Fil. lv. 7.) Common in Sarawak.
Distribution: Himalayas to Ceylon, Malaya, Aneiteum, Queensland.

A. semicostatum, Bl. (Syn. Fil. lv. 8.) Mt. Matang. In the island of Balabac by Mr. A. H. Everett.
Distribution: Malaya, Ceylon Philippines, Polynesia.

A. latifolium, Bl. (Syn. Fil. lv. 13.) Found by Beccari on Gunong Wah, Sarawak. Cesati Fil. Becc. Born. p. 80.
Distribution: Java and Bootan.

VITTARIA. (Gen. lvi. Syn. Fil. p. 395.)

C. elongata, Sw. (Syn. Fil. lvi. 1.) Common in Sarawak and North Borneo.

Distribution: Malaya, Ceylon, to N. India; Polynesia; Australia; Tropical Africa and its islands.

V. crassifolia, Baker, Kew Bulletin, Aug. 1893 p. 212 (1*) Mt. Dulit, Sarawak 5,000 ft.

V. pumila, Mett. (Syn Fil. lii. 3. p. 51.) Borneo, Wallace.

V. debilis, Kuhn. (Syn. Fil, lvi. 3. p. 518.) Sarawak by Lobb; North Borneo by Burbidge.

V. sulcata, Kuhn. (Syn. Fil. lvi. 3. p. 518.) Mt. Matang Sarawak: Mt. Kinabalu by Dr. Haviland at 10,500 ft.
Distribution: Malay Peninsula, Ceylon, New Guinea, Society Islands.

V. (Tœniopsis) lineata, Sw. (Syn. Fil. lvi. 7.) Mt. Tiang Laju, Batang Lupar district, Sarawak, by Beccari.

V. (Tœniopsis) scolopendrina, Thwaites (Syn. Fil. lvi. 9.) Common in Sarawak.
Distribution: Malaya, Ceylon to Himalayas, Philippines, Seychelles, Mozambique.

TŒNITIS. (Gen. lvii. Syn. Fil. p. 096.)

T. obtusa, Hooker, (Syn. Fil. lvii. 1.) Borneo by Thomas Lobb. Not seen by me.

T. blechnoides, Sw. (Syn. Fil. lvii. 5.) Common in Sarawak and North Borneo.
Distribution: Malaya, Ceylon, Philippines.

——— Var. *interrupta*, Wall. (Syn. Fil. lvii. 5.) Mt. Matang, Sarawak; North Borneo by Burbidge.

DRYMOGLOSSUM. (Gen. lviii, Syn. Fil. p. 397.)

D. piloselloides, Presl. (Syn. Fil. lviii, 2.) Common in Sarawak and North Borneo. Both sterile and fertile fronds often forked.
Distribution: Malaya, Ceylon to Himalayas, and eastward to Fiji.

D. rigidum, Hk. (Syn. Fil. lviii. 3.) Borneo, by Thomas Lobb.
Not seen by me.

HEMIONITIS. (Gen. lix. Syn. Fil. p. 398.)

H. Hosei, Baker Jour. Bot. 1891 p. 108 (1*.) Mt Matang, Sarawak. I have only found this once, and as far as I know it has not been collected by anyone else. The only other species of this Genus which belongs to this part of the world is *H. lanceolata*. Hooker, which has been found in New Guinea by Beccari.

TRIBE XIII. ACROSTICHIÆ.

ACROSTICHUM. (Gen. lx. Syn. Fil. p. 518.)

§ ELAPHOGLOSSUM.

A. Beccarianum, Baker ; Beccari, Malesia iii. 27, and Baker, *New Ferns* Ann. Bot. Vol. v. 1891 (9*.) This is the Fern called by Cesati *A. norrisii*, in Fil. Becc. Born. p. 31. Kuching, Sarawak.

§ STENOCHLŒNA.

A. (*Stenoch.*) *sorbifolium*, L. (Syn. Fil. lx. 66.) Mt. Matang. N. Borneo by Burbidge.
Distribution : Tropical regions all round the world.
A peculiarity of this Fern, not uncommon in Borneo and the Malaya Peninsula, is alluded to by Col. Beddome in *Ferns of British India* p. 423. The lower part of the plant differs curiously from the upper part. For a distance of two or three feet from the ground the rhizome is thin, almost threadlike, and bears short fronds with deeply pinnatifid pinnæ : it then swells out to the normal thickness of $\frac{1}{4}$ in. or more, and bears sterile and fertile fronds of the usual form and size.

A. (*Stenoch.*) *scandens*, J. Sm. (Syn. Fil. lx, 68.)

Common in Sarawak and N. Borneo. The young shoots are eaten.

Distribution: Malaya, Ceylon to the Himalayas, S. China, Queensland and Fiji.

§ POLYBOTRYA.

A. (*Polyb.*) *stenosemiodes*, Baker, Jour. Linn. Soc. xxii. 230 (71.*) Mt. Matang, Sarawak at 1,000 ft.

§ EGENOLFIA.

A. (*Egen.*) *appendiculatum*, Wild. (Syn. Fil. lvi 84.) The Island of Balabac by Mr. A. H. Everett.
Distribution: Malaya, throughout the Indian region, Philippines and Hongkong.

§ STENOSEMIA.

A. (*Stenos.*) *auritum*, Sw. (Syn. Fil. lxi. 91.) Mt. Matang; and Niah in the Baram District, Sarawak.
Distribution: Malaya, Philippines and Solomon Islands.

§ GYMNOPTERIS.

A. (*Gymn.*) *oligodictyon*, Baker, Jour. Linn. Soc. xxiv. p. 261 (93*.) Niah in the Baram District, Sarawak. Near the last species.

A. (*Gymn.*) *quercifolium*, Retz. (Syn. Fil. lx. 97.) Kudat, N. Borneo.
Distribution: Ceylon and Peninsula India, S. China, Co-chin China.

A. (*Gymn.*) *flagelliferum*, Wall. (Syn. Fil. lx. 100.) Niah in the Baram District, Sarawak; Island of Balabac by Mr. A. H. Everett.
Distribution: Malaya, N. India, Burmah, Philippines, Solomon Islands.

A. (*Gymn.*) *subrepandum*, Hk. (Syn. Fil. lx. 103.) Mt. Gading, Lundu, Sarawak.
Distribution: Singapore, Penang, Philippines.

A (*Gymn.*) *exsculptum*, Baker. Jour. Bot. 1888 p. 326 (107·*)

Niah in the Baram District, Sarawak.

§ CHRYSODIUM.

A. (*Chrys.*) *modestum*, Baker, Jour. Linn. Soc. xxii. p. 231 (108*.)
Banks of the Kabo, a branch of the Krian River, Sarawak

A. (*Chrys.*) *antrophyoides*, Baker, Jour. Linn. Soc. xxii. p. 231. (110*.) Mt. Matang, Sarawak.

A. (*Chrys.*) *bicuspe*, Hk. (Syn. Fil. lx. 115.) Mt. Lingga, and Mt. Dulit, Sarawak.
Distribution: Malaya, Formosa, Loochoo Islands.

——— Var. *integrifolium*, Eaton. I found this on Mt. Lingga growing along with the normal form. I doubt if it is a true variety.

A. (*Chrys.*) *Blumeanum*, Hk. (Syn. Fil. lx. 122)? On Mt. Matang I have twice met with a plant entirely corresponding to this Fern as found in Perak, but bearing sterile fronds only.

A. (*Chrys.*) *aureum*, L. (Syn. Fil. lx. 127.) Common.
Distribution: Near the sea in the warm regions all round the world.

§ HYMENOLEPIS.

A. (*Hymeno.*) *spicatum*, L. (Syn. Fil. lx. 129.) Common.
Distribution: Malaya; N. and S. India and Ceylon; Queensland, Society Islands.

§ PHOTINOPTERIS.

A. (*Photin.*) *rigidum*, Wall. (Syn. Fil. lx. 131.) Banting; and on the Sarawak and Undop Rivers, Sarawak.
Distribution: Malaya and Philippines.

A. (*Photin.*) *drynarioides*, Hooker, (Syn. Fil. lx. 132.) In North Borneo by Burbidge.
Distribution: Penang, and Perak in the Malay Peninsula.

PLATYCERIUM, (Gen. lxi. Syn. Fil. p. 425.)

P. grande, J. Sm. (or A. Cunn.?) (Syn. Fil. lxi. 3.) North Borneo by Burbidge.
Distribution: Singapore, Philippines, N. Australia.

P. biforme, Bl. (Syn. Fil. lxi. 5.) Common in Sarawak and N. Borneo.
Distribution: Malaya and Philippines.

Subord. iii. OSMUNDACEÆ.

OSMUNDA. (Gen. lxii. Syn. Fil.)

O. javanica, Bl. (Syn. Fil. lxii. 1.) In the Sulu Archipelago by Burbidge.
Distribution: Kamschatka to Java.

SUBORDER IV. STHIZÆACEÆ.

Schizæa (Gen. lxiv. Syn. Fil.)

S. malaccana, Baker (Syn. Fil. lxiv, 3.) Mt. Matang 3,000 ft, Sarawak, and in North Borneo by Burbidge.
Distribution : Malaya, Philippines.

§ *Lophidium.*

S. (*Loph.*) *dichotoma*, Sw. (Syn. Fil. lxiv, 13.) Not uncommon in Sarawak, near the Undop River, in the Quop district and elsewhere ; North Borneo by Burbidge.
Distribution: Malaya, South India, Philippines ; Australia, Polynesia ; Mascaren Islands, Tropical America and West Indies.

§ *Actinostachys.*

S. (Actin.) *digitata.* Sw. (Syn. Fil. lxiv. 16.) Near the Undop River, Sarawak.
Distribution: Malaya, Ceylon to Himalayas, Philippines, Fiji.

LYGODIUM (Gen. lxviii. Syn. Fil. p. 436.)

L. dichotomum, Sw. (Syn. Fil. lxviii. 2.) Common everywhere.

Distribution : Malaya, Ceylon to North India, Philippines, Chusan, Hongkong.

L. scandens, Sw. (Syn. Fil. lxviii. 7) Common everywhere.
Distribution : Malaya, Ceylon to Himalayas, South China, Queensland ; Guinea Coast.

Suborder V. Marattiaceæ.

Angiopteris. (Gen. lxix. Syn. Fil. p. 440.)

A. evecta. Hoffm. (Syn. Fil. lxix. 1) Santubong, Lingga, Sebetan River, and the Baram District, Sarawak.
Distribution : Malaya, Ceylon to Himalayas, Madagascar, New Caledonia, Queensland, Society Islands.

Kaulfussia, (Gen. lxxii. Syn. Fil. p. 444.)

K. æsculifolia, Bl. (Syn Fil. lxxii, 1.) Mt. Matang at 2500 ft.
Distribution: Malay Peninsula and Islands, N. India, Philippines.

Suborder VI. Ophioglossaceæ.

Ophioglossum, (Gen. lxxiii. Syn. Fil. p. 444.)

O. reticulatum, L. (Syn. Fil. lxxiii. 6.) This I have found once only at Kuching, Sarawak. I sent the specimen gathered to Kew, and have not met with it again. = *O. Cumingianum*, Presl.

§ Ophioderma.

O. (*Ophiod.*) *intermedium*, Hk. (Syn. Fil. lxxiii. 7.) Borneo, by Lobb.

O. (*Ophiod.*) *pendulum*, L. (Syn. Fil. lxxiii. 8.) Kuching, Sarawak.
Distribution : Malaya, Ceylon to Assam, Philippines, N. Australia, Polynesia, Mascaren Islands.

Helminthostachys, (Gen. lxxiv. Syn. Fil. p. 447.)

H. zeylanica, Hk. (Syn. Fil. lxxiv. 1.) Saribas River, Sarawak.
Distribution : Malaya, Ceylon to Himalayas, Philippines, New Caledonia, and Queensland.

G. F. Singapore and Sarawak.

THE SCITAMINEÆ OF THE MALAY PENINSULA.

The traveller in the forests of the Peninsula can hardly fail to notice the beauty of many of our wild gingers *(Scitamineæ)* and would be surprised to find how much this interesting group of plants has been neglected by botanists, for though many have received names, but few have been completely described, and the descriptions of Malayan species by Miquel and Blume are often so incomplete that it is impossible to make out what plants they are intended for. Many descriptions have been made from badly dried specimens, and unless special care is taken these plants do not preserve well, for the flowers are thin and fugacious, and the spikes usually full of water, and unless the flowers are dried separately from the spikes they are apt to rot in the press. Very few kinds again have been cultivated in gardens either in the East or in Europe, but those that have, have often been well figured and described. In studying this group here, I have in nearly every case compiled the description from specimens in the jungle itself. or from plants brought home and cultivated in the Botanic Gardens.

The Order consists of five groups, which, beginning with the most specialised, are *Zingiberaceæ*, *Marantaceæ*, *Cannaceæ*, *Lowiaceæ* and *Musaceæ*.

The typical monocotyledonous flower consists of three sepals (calyx) three petals (corolla) six stamens in two whorls and three pistils. In this order the sepals are usually united into a tube and the corolla also forms a tube, with the petals free at the top (corolla lobes.) The stamens in the *Musaceæ* (Bananas) and *Lowiaceæ* are five in number, one being entirely suppressed, or forming part of the lip. In the Arrow-roots, (*Marantaceæ*) only four are developed, one forms the lip, another is spathulate and hooded (the cucullate stamen) a third is flat and resembles a petal (petaloid) and the other is narrow and bears in its edge an anther cell. This curious arrangement is

an elaborate contrivance for insect fertilization which cannot easily be explained without diagrams. In the Cannas (Cannaceæ) four of the stamens are petaloid and the fifth bears an anther cell on its edge. These plants are self-fertilized in bud. No Cannas are really wild here but one or two have escaped from cultivation. The *Zingiberaceæ* have a single complete stamen only, the rest being either entirely suppressed except one which forms the lip, or two more may appear as petal-like lobes or horns or teeth, (Staminodes). The ovary is three-celled in most of the order, but bears only one style, which is however three-lobed in *Lowiaceæ*, showing its origin from three styles. In all the *Zingiberaceæ* but one or two genera, there are at the base of the corolla tube, two small processes, the stylodes, which are probably the remains of the other styles, or possibly some of the lost stamens. Their function is apparently to secrete nectar which fills the bottom of the tube. The flowers of nearly all are fertilized by bees, or sometimes flies. The spikes, racemes or panicles are borne on leafy stems or spring directly from the rhizome, the leaves being borne on different stems. As a rule plants growing in dense jungle have the flowers close to the ground on short leafless stems, while those which grow on river banks or open spaces have them on the ends of leafy stems. The fruits of the different groups do not differ much, except in the case of the Musas, which have the well known Banana fruit, the rest have capsules of two or more seeds (in *Donax* there is often but one seed). The seeds are usually enclosed in a sweet aril, and in the *Zingiberaceæ* are usually very aromatic. The fruits are seldom conspicuous, and often only dull green in color. This is especially the case with those which fruit near the ground, the seeds of which are distributed by mice and squirrels who eat the sweet pulp (aril) surrounding the seed. The fruits of some of the terminal spiked species, *e.g. Alpinia*, are orange and showy, and the seeds dispersed by birds.

USES. The *Zingiberaceæ* are nearly all very aromatic, and many have very strongly flavoured root-stocks, which are used as spices. Among these the Ginger, Turmeric, and Zedoary, and Galangal are commonly cultivated here, and many of the wild Globbas, and Amomums are used in native medicine. The

fruits of a few species of *Amomum*, e. g. *A. uliginosum*, are eaten also by Sakais. The buds of *Hornstedtia imperialis* are also popular as curry-stuffs among the Malays, and the fruit of the commonest of our wild plantains, *Musa Malaccensis* is quite eatable, though it is small and full of seed. Indeed I believe that this plant is the parent of several of the local cultivated Pisangs. The wild plantains also give a very good fibre from the leaf sheaths, though it is not by any means as good as that of the Manilla hemp (*Musa textilis).* The stout stems of the Bemban (*Clinogyne*) split up, are used for making baskets, and I found that the leaf stems of the bigger Gingers, (*Hornstedtia*), beaten up and treated with caustic potash, formed a very good paper stuff, and might be used for that purpose, if there was sufficient demand for it.

GROUPS.

Fertile stamen one : with two cells. Aromatic. *Zingiberaceæ.*
,, with one cell. Not aromatic. *Marantaceæ.*

Fertile stamens 5. Calyx lobes long, lip large, small plants *Lowiaceæ.*
,, Calyx, and corolla sheath-like, lip small, very large plants *Musaceæ.*

SYNOPSIS OF ZINGIBERACEÆ.

Staminodes broad and petaloid, Spike or panicle terminal.

1. *Globba.* Stamen much longer than the corolla, slender. Lip adnate to it above the corolla.

2. *Hedychium.* Stamen long and slender. Lip not adnate above the corolla.

3. *Camptandra.* Stamen short, anther dorsifixed versatile. Staminodes much broader than corolla, flat.

4. *Kæmpferia.* Anther cells on a broad thin connective. Staminodes much broader than corolla, flat.

5. *Gastrochilus.* Staminodes not broader than corolla lobes. Anther thick terminal. Spike terminal or radical cylindric.

6. *Curcuma.* Staminodes not broader than corolla lobes. Flowers in a cone-like spike radical.

7. *Conamomum.* Staminodes smaller than corolla lobes, anther with long curved arms. Spikes radical.

Staminodes small absent, or adnate to lip.

8 *Costus*. Spikes terminal or radical. Stamen with a thin petaloid filament.

Spikes dense with large persistent bracts. Filament thick.

9. *Zingiber*. Anther with a long curved beak, Lip three-lobed.

10. *Amomum*. Anther with two curved arms, Lip broad,

11. *Hornstedtia*. Anther with no arms, crest small or none, Lip narrow.

12. *Plagiostachys*. Spike lateral from the leafy stem.

13. *Elettariopsis*. Panicle lax creeping from the rhizome.

14. *Geostachys*. Panicle compact erect or pendulous from the rhizome.

15. *Alpinia*. Panicle terminal on a leafy stem.

GLOBBA.

This pretty genus is very distinct from all except the Indian Mantisia, in the peculiar form of the flowers, which are borne on a long slender panicle with short branches. The calyx is tubular or cup-shaped, the corolla tube usually slender and longer with small boat-shaped lobes reflexed when the flower is open, and a pair of staminodes very similar to the corolla lobes. The lip base is parallel to the erect stamen and its sides joined to it, forming a tube, the limb or free portion is narrow and usually bilobed. . The tube contains nectar, and the entrance to it is a slit in front, at the foot of which is usually a brown or violet spot, a guiding mark for the insect visitors. The stamen above the lip is long and slender, and curved over at the top where it bears the oblong anther, which often has one or two pairs of processes at the sides usually flat and linear or triangular (the spurs). The style is long and slender and runs up along the stamen, passing between the anther cells in the usual way. The fruit is a small capsule as big as a pea, which when ripe splits widely open exposing a number of small brown seeds. The flowers are either yellow, or white or violet, and in some cases the bracts are coloured red or yellow, making the plants very showy. Globbas are to be found in all of

our forests on rocks, or in damp spots, often in great abundance. The genus occurs in the Himalayas and Burma, less commonly in other parts of India, and, except for one possibly introduced species, is absent from Ceylon. They are abundant all over the Malay Peninsula and Siam, Sumatra and Borneo, becoming rarer further east.

The species, though somewhat variable, are tolerably easily distinguished and classified, though it is not always easy to identify some of those that have been described on account of the authors having often omitted to describe important parts of the flower. Thus Miquel rarely described the anther-spurs, the best character for classifying the species, while Baker in the Flora of British India while paying due attention to this character lays some stress on the presence or absence of bulbils, which are often produced from the axils of the bracts. This character however is absolutely worthless. Any globba growing in a sufficiently wet spot especially near a stream will produce bulbils sometimes completely replacing the flowers with them. In two species *G. marantina* and *G. bulbilifera* it is true that bulbils are invariably produced in the lower bracts, but all the species may at times bear them also. An important character also is the calyx, and as specimens are often met with in which the corolla is fallen away, this organ which remains on the fruit is very useful in identification. Sometimes it is regular and tubular with three equal points, sometimes dilated upwards or again curved with two large and one small tooth or there may be no trace of teeth or lobes.

Those who have not seen globbas in plenty growing wild might be puzzled by odd forms which sometimes occur in which the inflorescence is borne on leafless stems. Miquel's *G. aphylla* is probably one of these, perhaps a sport of the very common *G. panicoides*. Plants also with branching stems occur, but are much rarer.

§ Aplanthera.

Anthers spurless, Flowers yellow.

Gl. Wallichii Baker. Flor. Brit. Ind. p. 202.

About 2 feet tall, the lower sheathing leaves dotted with purple pubescent or hispid. Leaves lanceolate acuminate rather

thin in texture about 5 inches long by $1\frac{1}{2}$ inch wide, upper ones smaller, finely pubescent on both sides, sheaths long about 3 inches hispid, ligule rounded hispid. Panicle long and slender branches distant one inch long. Flowers crowded at the ends few orange. Bracts lanceolate very small. Calyx campanulate with two other long acute lobes and one shorter, $\frac{1}{8}$ inch long. Corolla tube $\frac{1}{4}$ inch long, lobes rather short $\frac{1}{8}$ inch long ovate. Staminodes longer $\frac{1}{4}$ inch long, linear oblong. Lip short linear entire with a brown central spot. Stamen filament $\frac{1}{2}$ an inch long, anther $\frac{1}{8}$ with no margin nor spurs. Capsule globose smooth.

Penang. Banks on Moniot's Road.

Gl. floribunda. Baker, p. 203,

Plant 2 feet tall, with oblong leaves nearly a foot long, pubescent, a long lax panicle with many branches 1 to $1\frac{1}{4}$ inch long, rachis very hairy. Bracts small and deciduous. Corolla pale yellow, lobes oblong, lip long not bifid, anther with a narrow border.

Johore. (King.)

I have never seen this either wild or in Dr. King's collections.

G. uliginosa. Miq,. Fl. ind. Bat. Suppl. p. 613. Baker. l c. p. 203.

Habit exactly that of *G. panicoides* Miq. Stems tufted 2 feet long, lower sheaths spotted with red. Leaves lanceolate acuminate three inches wide, glabrous above except for some rather long strigose hairs along the nerves, pubescent beneath sheaths hispid. Panicle long and lax with short scattered branches $\frac{1}{4}$ inch long with 2 or 3 flowers on each. Bracts oblong obtuse green. Calyx funnel-shaped with rather long acute lobes $\frac{1}{8}$ inch long. Corolla tube slender $\frac{1}{4}$ inch long, lobes ovate oblong, upper one boat shaped $\frac{1}{2}$ an inch long orange. Staminodes oblong obtuse. Lip very narrow and short bilobed, lobes linear obtuse orange with a black central spot. Filament slender $\frac{1}{4}$ inch long, anther cells narrow elliptic diverging at base with no margin or processes.

Singapore. Bukit Mandai ; Malacca. Alor Gajah.

Perak. Thaiping hills ; Gopeng (King). Penang (King) in Fl. Brit. Ind.

This plant is very near *G. panicoides* Miq,. differing in the absence of spurs to the anther, and the form of the calyx. It is possible that it is only an abnormal form. The Singapore plant produced leafless or almost leafless stems bearing panicles.

§ Ceratanthera.

Anther 2-spurred. Flower yellow.

Gl. panicoides. Miquel. l.c. 614.

Gl. Kingii. Baker. l.c. 204. *G. stenothyrsa* Bak. l.c.

Stems tufted, from nine inches to two feet in height usually rather slender, sheaths at the base spotted with red, more or less pubescent. Leaves narrow lanceolate acuminate to ovate acuminate $1\frac{3}{4}$ inch to 5 inches long and $\frac{3}{4}$ to one and a half inch broad, ligule hispid. Panicle slender, the branches usually short sometimes rather long spreading. Flowers usually few. Bracts lanceolate green. Calyx short unequally 3 toothed, one tooth much longer than the others, lanceolate blunt, orange $\frac{1}{8}$ inch long. Corolla tube $\frac{1}{2}$ inch long, lobes cymbiform $\frac{1}{4}$ inch long orange. Staminodes rather longer oblong, orange. Lip short oblong bilobed orange with a dark brown central spot. Stamen filament one inch long, anther cells parallel, connective developed all round and at the base prolonged into a pair of subulate spurs. Style longer than the stamen, stigma very small. Capsule globose smooth rounded green $\frac{1}{4}$ inch long terminated by the enlarged calyx.

Singapore, Bukit Timah and other woods; Muar (Feilding). Malacca, Sungei Hudang; Merlimau. Selangor, Kwala Lumpur, Batang Berjuntai, Petaling. Sungei Ujong; Bukit Tumiang. Perak. Bruas. Dindings. Province Wellesley, Tasek Gelugur. Lankawi, (Curtis 2642) also Lingga island (Hullett). Sumatra on the Kelantan river, Siak. Borneo, Sandakan, Bongaya river, Labuk bay and Sarawak.

This is a very common plant along stream banks and in damp spots in woods all over the Malay Peninsula. It is very variable in size, form of leaf, and length of panicle and its branches. The forms from Sarawak and Sandakan are stout broad leaved forms with branches an inch and a half long, and

longer calyces, but I can only consider them as extreme forms.

I have the authority of Dr. King for identifying *G. Kingii* Baker with the ill-described *G. panicoides* of Miquel of which he has seen a type. It would indeed be strange if so very abundant and conspicuous a plant had escaped Miquel. I cannot from the description distinguish *G. stenothyrsa* Baker. from this plant. It is based on specimens from Tenasserim collected by Parish, and from a plant collected by Cuming in Malacca.

Like all other Globbas, this often produces bulbils in the axils of the bracts, and often the whole panicle produces bulbils instead of flowers.

It is known to the Malays by a variety of names, *viz.* Haliya hutan (wild ginger), Meroyan Tingal, and Meroyan B'rchoin, Pua Birah, Bunga Lidah Munta, Haliya K'ra. The slightly aromatic roots are used in native medicine for fever, and rheumatism.

Gl. pendula Roxb. Asiat. Res. XI. 359 Fl. Ind. 179.

A large plant 3 feet or more tall. Leaves oblong cuspidate 9 inches long, 4 across glabrous, ligule rounded pubescent, sheaths with pubescent edges. Panicle stout sometimes nearly 2 feet long, branches short few-flowered. Bracts lanceolate caducous. Calyx funnel-shaped $\frac{1}{4}$ inch long, with 3 unequal acute lobes. Corolla tube slender half a inch long, lobes cymbiform $\frac{1}{4}$ inch long orange yellow.

Staminodes thin oblanceolate obtuse as long. Lip adnate from a little above the staminodes narrow bilobed orange with a maroon central spot nearly $\frac{1}{2}$ an inch long. Stamen filament over $\frac{1}{2}$ an inch long, anther elliptic horns linear subulate 2 about as long as the anther, connective prolonged above the anther into a rounded process.

Penang. Banks close to the Waterfall. Perak on Maxwell's hill. Kedah Peak by the Cascade. Pahang, Tahan river. One of the biggest species. The name *pendula* is by no means a good one, as the stout panicle is usually stiffly erect.

Gl. montana n.sp.

Stems about 2 feet tall. Leaves lanceolate cuspidate thin 7 inches long $1\frac{1}{2}$ inch broad, with a long attenuate point, glabrous above paler pubescent beneath, petiole short but usually distinct,

ligule rounded pubescent, sheaths very hairy. Paniele long slender 1 to 1½ foot long, branches 1 to 2 inches long, horizontal rather distant few flowered. Bracts ovate oblong ⅛ inch long. Calyx campanulate lobes acute, ⅛ inch long. Corolla tube slender ½ inch long, lobes broadly ovate obtuse ¼ inch long, yellow. Staminodes absent. Lip small free for some distance above the corolla lobes apex rounded almost entire. Stamen, filament above the lip ½ an inch long, anther small elliptic with large flat triangular wings running the whole length but shorter than the anther.

Kedah Peak, and near the waterfall.

This is a stout plant like *G. pendu'a* Roxb, but is remarkable in the anther spurs, which form a triangle in the centre of which are the anther cells. The staminodes seem to be entirely wanting.

Gl. calophylla n.sp.

Stems over a foot tall fairly stout, lower sheaths spotted red. Leaves oblong lanceolate acuminate with a long point 6 inches long 1¾ inch broad, deep green above with silvery central and lateral bars, glaucous tinted with red beneath, base narrowed into a petiole, glabrous above pubescent especially along the midrib beneath. Panicle 6 inches long branches spreading distant an inch long, many flowered. Bracts broadly oblong ovate $\frac{1}{16}$ inch long persistent for some time. Calyx tubular campanulate dilated upward ⅛ inch long with short lobes. Corolla tube very slender ¼ inch long, lobes boat-shaped broad blunt yellow. Staminodes oblong half as long again as the lobes. Lip short linear apex bifid lobes rounded, orange with no spot. Filament very slender ¾ inch long, anther spurs 2 broad triangular, as broad as the anther at the base. Bulbils sometimes produced.

Siam near Pungah (Curtis No. 3286.)

This pretty plant is noticeable from its ornamentally colored leaves and botanically it is remarkable for its dilated calyx and its unusually large staminodes and very short narrow lip.

Gl. malaccensis n.sp.

Stems 2 feet tall or longer. Leaves broadly lanceolate acuminate rather distant six inches long, 2 across, glabrous,

ligule short rounded pubescent, sheath pubescent, petiole distinct sometimes half an inch long. Panicle short compact on a long peduncle nude except for a few distant bracts, the lowest of which are nearly 2 inches long linear green; branches short about $\frac{1}{4}$ inch long few flowered. Calyx cylindric with short acute lobes nearly $\frac{1}{4}$ inch long. Corolla tube very slender $\frac{1}{2}$ an inch long, lobes ovate boat-shaped less than $\frac{1}{4}$ inch long yellow. Staminodes oblong obtuse about as long. Lip short linear oblong entire. Anther oblong with two triangular subulate spurs from the centre of the side, filament $\frac{3}{4}$ inch long. Capsule globose wrinkled $\frac{1}{4}$ inch long.

Malacca. Woods at the base of Mt. Ophir: Bukit Sedanen. Selangor, Bukit Hitam (Kelsall). Sungei Ujong, Bukit Sulu; Bukit Kandong.

This is called by the Malays, Pua Rimbah, Pua Hudang and Pua Gajah, and is used medicinally in childbirth.

It has the habit of *G. aurantiaca* Miq, but is very much less hairy and has only two spurs on the anther, and the long peduncle with a terminal dense panicle and narrow persistent bracts distinguish it from all others.

Gl. integra n.sp.

Stem 3 to 4 feet tall. Leaves oblong lanceolate cuspidate subpetiolate about a foot long and three inches across, the point nearly 2 inches long, glabrous above minutely pubescent beneath, ligule rounded and pubescent. Panicle about a foot long rather weak, branches $\frac{1}{2}$ an inch long or less, patent numerous with two or three flowers at the end. Bracts oblong ovate $\frac{1}{8}$ inch long. Calyx small campanulate $\frac{1}{8}$ inch long, lobes ovate obtuse. Corolla tube about twice as long, lobes boat-shaped obtuse $\frac{1}{4}$ inch long orange. Staminodes much smaller oblong. Lip narrow linear obtuse entire. Filament short, anther oblong with a broad triangular wing on each side.

Siam, Bangtaphan, common along Ba Quean stream. (Dr. Keith.)

This species is remarkable for its short flowers, narrow entire lip and broad triangular anther-spurs.

Gl. Keithii n. sp.

Leaves narrowly lanceolate cuspidate six inches long about

$\frac{1}{2}$ an inch broad, glabrous, ligule absent. Panicle over six inches long with numerous branches 2 inches long or less with a few flowers at the apex. Bracts linear lanceolate persistent $\frac{1}{2}$ an inch long. Calyx slender tubular $\frac{1}{4}$ inch long lobes lanceolate. Corolla tube very long and slender $\frac{3}{4}$ inch long grey, lobes obtuse boat-shaped less than $\frac{1}{4}$ inch long yellow. Staminodes lanceolate oblong yellow. Lip long and narrow deeply bilobed lobes rounded. Filament very slender $\frac{1}{2}$ an inch long, anther elliptic grey with a lanceolate acuminate spur on each side in the upper part of the anther,

Siam. Bangtaphan in Bamboo-jungle. (Dr. Keith.)

The very narrow leaves, and long corolla tube, and the curious anther spurs easily distinguish this plant.

Flowers white or violet.

Gl. leucantha Miq. l. c. 612.

Gl. pallidiflora Bak. l. c. 204.

Rhizome short, roots with tuberous fusiform swellings. Stems about two feet tall, often less. Leaves broadly lanceolate acute, 8 inches long and 3 across, very finely pubescent especially on the under surface, dark green above, purple beneath, sheaths striate hispid usually spotted with purple, ligule short hardly $\frac{1}{8}$ inch long, rounded hispid. Panicle terminal rarely radical, lax, with spreading branches two inches long. Bracts ovate $\frac{1}{8}$ inch long. Flowers in threes on the branches, ivory white. Bracts ovate pure white. Calyx tubular with three teeth, two longer than the third, $\frac{1}{4}$ inch long white shining, minutely pubescent. Corolla tube slender about $\frac{1}{2}$ an inch long, lobes cymbiform $\frac{1}{4}$ inch long. Staminodes narrower oblong a little longer. Lip short oblong rounded shortly bilobed, white with a purplish brown spot, (sometimes absent). Stamen nearly one inch long (above the corolla) anther cordate with two slender subulate horns a little longer than it, cells yellowish. Style slender longer than the anther, ovary white pubescent. Stylodes cylindrical acute. Capsule globose $\frac{3}{16}$ inch long polished smooth bright green. Seeds about 8, angled $\frac{1}{8}$ inch long.

Singapore, common on Bukit Timah, Chan Chu Kang, etc. Pulau Damar, Johore, Tanah Runto; Gunong Pulai; Gunong Panti (King). Perak, Dindings at Lumut.

A very pretty species, the whole of the inflorescence being pure white and much of it polished like ivory. It frequents rather dry parts of woods often growing on rocks. Forms occur in which the leaves on some of the flowering stems are suppressed, the stems being merely covered with sheaths In one plant the stem bore axillary panicles as well as the terminal one. Bulbils are often to be met with on the lower branches of the panicle but more rarely than in other species.

Gl. albiflora n. sp.

Stems three feet tall. Leaves narrowly lanceolate acuminate cuspidate eight inches long, one inch broad, glabrous green with a silvery grey variegation along the midrib when young, ligule very short, sheath glabrous. Panicle 12-15 inches long with distant slender branches spreading, one inch long or less. Bracts persistent linear obtuse nearly $\frac{1}{4}$ inch long. Flowers white, one or two only on the ends of the branches. Calyx tubular with short lanceolate lobes. Corolla tube very slender $\frac{1}{2}$ an inch long, lobes boat-shaped ovate. Staminodes longer oblong linear. Lip short obcuneate bilobed, lobes rather long divergent. Filament $\frac{3}{4}$ inch long anther oblong, spurs 2 linear acuminate falcate, longer than the anther.

Penang: Government Hill near the cooly lines (Curtis 2851). A rather slender, narrow leaved plant, remarkable for its long persistent bracts, and long upcurved spurs of the anther.

Gl. elegans n. sp.

Stems over a foot tall rather slender. Leaves lanceolate acuminate minutely pubescent beneath, 5 inches long, $1\frac{1}{4}$ inch wide, ligule and margin of sheath hispid. Panicle erect rather slender with short stiff spreading branches half an inch long. Bracts lanceolate green persistent $\frac{1}{8}$ inch long. Flowers few crowded at the ends of the branches, white. Calyx unequally 3 lobed, lobes acute, $\frac{1}{4}$ inch long, Corolla tube nearly $\frac{1}{3}$ an inch long, lobes, oblong ovate obtuse $\frac{3}{16}$ inch long. Staminodes very similar and as long, Lip short oblong ovate obtuse entire white with a violet central spot. Filament $\frac{1}{2}$ an inch long, spurs of anther linear curved up at the ends $\frac{3}{16}$ inch long, Capsule globose smooth $\frac{1}{4}$ inch long

Dindings, Woods near Bruas, and Gunong Tungul. (No 8392). This resembles *G. leucantha* Miq, but has smaller nearly glabrous leaves, straight and slender panicle and an entire lip.

Gl. violacea n. sp.

Stems one to two feet tall rather stout. Leaves large or moderate oblong lanceolate acuminate with a long point, covered with scattered strigose hairs on both surfaces, or sometimes only scabrid, 7 to 10 inches long, 2 inches broad, dark green above paler beneath, ligule short rounded very hairy, sheaths with stiff hairs. Panicle of numerous short branches about half an inch long stiff and horizontal. Bracts small ovate lanceolate white. Calyx cylindric with three short points, one shorter than the others, as long as the corolla tube. ivory white. Corolla tube $\frac{1}{4}$ inch long, lobes ovate boat-shaped violet or white. Staminodes longer and narrower violet, $\frac{1}{4}$ inch long. Lip very narrow linear grooved nearly the whole way down bilobed, violet or white with a darker spot near the apex, apex yellowish. Stamen long rather stout, anther oblong rather large violet, with two long linear spurs. Capsule smooth globose white dehiscing entirely and exposing a number of ovoid beaked brown seeds.

Johore: Gunong Pulai. Selangor, Bukit Hitam (Kelsall). Perak, Bujong Malacca; Gunong Keledang. Ipoh (Curtis 3316) Gunong Inas (Wray 4164). Dindings.

This is very nearly allied to *G. leucantha*, but the corolla tube is much shorter, and the lip very much narrower. The flowers are sometimes entirely ivory white, at others violet.

§ Marantella.

Anther 4 spurred. Flowers yellow.

Gl. aurantiaca Miq. l. c. 613.

Rhizome short. Stems about 18 inches tall, the bases covered with hairy sheaths. Leaves oblong to ovate cuspidate 7 inches long and 3 wide (often much smaller) hairy beneath, sheaths hairy. Peduncle 18 inches or less, hairy. Panicle compact usually short sometimes as much as 8 inches long, branches short $\frac{1}{4}$ inch long, numerous horizontal, with a few empty bracts at the base and two or more flowers. Bracts orange, oblong obtuse hispid $\frac{1}{8}$ inch long, lower ones sometimes

bulbilliferous. Pedicels $\frac{1}{4}$ inch long, pubescent. Calyx funnel-shaped $\frac{1}{4}$ inch long 3 toothed, teeth short and blunt pubescent. Corolla yellow, tube nearly $\frac{1}{2}$ an inch long lobes rather large oblong. Lip short broad oblong bilobed orange with a brown central blotch. Staminodes short oblong. Stamen filament slender $\frac{1}{4}$ inch long, anther oblong with two pairs of triangular teeth. Fruit globose smooth crowned with the long tubular calyx.

Malacca, Brisu (Derry, No 18). Selangor, common, Bukit Hitam; Bukit Kudah. Negri Sembilan, Gunong Berumbun. Perak, Larut Hills. Penang, Moniot's road. This plant, the "Pua Gumbur" of the Malays, is easily recognised by its hairy stem, broad hairy leaves and crowded panicle.

Gl. perakensis n. sp.

Stem stout about a foot or a foot and a half tall. Leaves obovate cuspidate broad, narrowed at the base glabrous, 8 inches long by 4 wide, petiole $\frac{1}{4}$ inch hispid, ligule short oblong rounded. Peduncle 8 inches long with large ovate orange bracts, the lowest an inch long, upper ones smaller oblong obtuse, softly pubescent, edges ciliate. Panicle short an inch long dense, branches about half an inch long pubescent. Bracts short and broad ovate orange. Calyx short tubular $\frac{1}{8}$ inch long pubescent, orange. Corolla tube twice as long, lobes ovate. Lip short broad oblong bilobed orange with a brown central spot. Staminodes oblong linear obtuse pale orange. Stamen connective of 4 triangular broad spurs. Capsule globose, pustulate, especially when young, orange color.

Perak, Ipoh, Kinta, (Curtis 3141) Rocks on Bujong Malacca.

Allied to *G. aurantiaca* Miq. but less hairy, the peduncle being only softly pubescent; the sheathing leaves on the peduncle are very much larger and broader and the lip shorter and broader almost square in outline.

Gl. variabilis. Ridl. Trans. Linn. Soc. Vol. 3. p. 378.

Stems over a foot tall. Leaves ovate or ovate lanceolate acuminate 4 inches long, $1\frac{1}{2}$ inch broad, glabrous dark green above and purplish beneath. Panicles about 4 or 5 inches long rather compact with short branches. Bracts $\frac{3}{8}$ inch long oblong

orange or scarlet persistent. Calyx straight lobes acute orange. Corolla tube more than twice as long, lobes oblong, upper one boat-shaped. Staminodes lanceolate oblong shorter. Lip oblong cuneate bilobed broad $\frac{1}{4}$ inch long orange with a chestnut spot. Filament $\frac{3}{4}$ inch long, anther with 4 acute spurs the upper ones longest. Capsule subglobose wrinkled.

Pahang Woods near Kota Glanggi and Tahan.

This pretty plant is most closely allied to *G. atrosanguinea* of Borneo, and also to *G. Schomburgkii* Hook, of Siam. Its broad conspicuous orange or red bracts, add much to its beauty and make it a showy plant. The squared lip broadest at the tip resembles that of *G. perakensis* Ridl.

G. cernua Baker l. c. p. 205.

Stems several about a foot tall, bases purple. Leaves ovate acuminate cuspidate dark polished green above paler beneath 4 inches long, $1\frac{1}{2}$ inch broad, petiole $\frac{1}{4}$ inch long or less, ligule short broad truncate, sheath and midrib pubescent. Panicle short nodding six inches long, rachis pubescent, base nude except for some (about 6) lanceolate acute to oblong bracts, the largest $\frac{1}{2}$ an inch long; branches short spreading an inch long. Floral bracts ovate oblong $\frac{1}{4}$ inch long by $\frac{1}{8}$ inch across persistent green. Flowers sessile clustered at the ends of the branches with one or more ovate yellow bracts. Calyx tubular $\frac{1}{4}$ inch long equally lobes equal short blunt, yellow. Corolla tube slender pubescent nearly $\frac{3}{4}$ inch long, light yellow lobes ovate boat-shaped $\frac{1}{4}$ inch. Staminodes linear oblong rather longer light yellow. Lip short oblong dilated towards the tip, bilobed lobes spreading acute, yellow with a central green spot, $\frac{1}{4}$ inch long. Filament $\frac{1}{8}$ inch long yellowish, anther spurs 4 upper ones subulate lower ones broader. Capsule wrinkled green.

Perak: Thaiping hills; Bujong Malacca; Gopeng (King).

This species, which appears to be local, though common on the Thaiping Hills, is easily recognized by its decurved panicles of lemon yellow flowers.

Gl. brachycarpa Bak. l. c. c.

Stem $1\frac{1}{4}$ foot rather slender, sheaths hairy. Leaves ovate acuminate 5 inches long glabrous above, minutely pubescent

beneath, ligule very short glabrous. Panicle short nodding with a few distant short branches, lower bracts ovate lanceolate $\frac{1}{4}$ inch long green persistent; branches $\frac{1}{8}$ inch long, flowers 4 or 5 crowded at the ends. Calyx funnel-shaped entire $\frac{1}{8}$ inch long. Corolla pale yellow, lobes ovate. Lip linear entire with a dark central spot. Anther with 4 equal triangular spurs. Capsule globose pustular.

Perak, Thaiping Hills 2-3000 feet. King (2414). (Curtis 2073).

Nearly allied to the last but distinguished by its broader persistent bracts at the base of the peduncle, and the calyx which is shaped like an old-fashioned conical goblet.

G. versicolor Smith. Exot. Bot. t. 117 is mentioned as occurring in the Malay Peninsula by Roxburgh and by Koenig, who collected it in Junk Ceylon, and saw it in a dwarf state near Malacca. (This latter plant was probably *G. panicoides*.) It does not seem to have been seen in our region since.

G. bulbifera Roxb. is stated in the Flora of British India to occur in the Malay Peninsula, but I have never seen it in a wild state, nor does it occur in any of the collections.

Hedychium.

H. longicornutum Baker. Fl. Brit. India. vi. p. 228.

An epiphytic plant with very thick grey fleshy roots which clasp the branches or stem of a tree. Rhizome short. Stems several about two feet tall, stout. Leaves oblong acuminate glabrous except the margins which are hairy, dark green, purplish beneath, one foot in length and four inches wide, ligule oblong lanceate two inches long, sheath hairy. Flower spike terminal four inches long dense. Bracts lower ones ovate; upper ones narrower lanceolate, one inch or more long covered with brown silky hairs. Buds erect cylindrical acute scarlet. Calyx spathaceous oblique one inch long slender pink. Corolla tube cylindrical slender $1\frac{1}{2}$ inch long, lobes narrowly linear deflexed red, three inches long by $\frac{1}{8}$ wide. Staminodes and lip similar linear undulate reflexed orange color, $1\frac{1}{8}$ inch long $\frac{1}{4}$ inch wide. Stamen five inches long base stout tapering upwards pinkish at the base white above, anther linear oblong orange $\frac{1}{8}$ an inch long. Stigma projecting beyond, club shaped. Capsule oblong with

rounded angles dark brown hairy 1½ inch long, dehiscing into three carpels, recurved bright orange within. Seeds sixteen in each cell, oblong angled ¼ inch long covered with an aril of soft crimson processes.

Johore, near Castlewood. Muar (Fielding). Malacca: Ayer Panas; Merliman; Woods at the base of Mt. Ophir, etc., common. Selangor, Gunong Hitam; Ginting Bidai. Perak, Larut Hills. Patani, Tomoh (Machado). Also Siak in Sumatra.

This very beautiful plant is widely scattered over nearly all of the Peninsula. It is epiphytic, growing usually rather low down on the branches of trees which it clasps with its curious fleshy roots, which resemble those of some orchid. The dense heads of flowers, with the long erect scarlet bands and the yellow recurved staminodes make it a most attractive plant. It is known to the Malays as Tepus Lada, and Ubat Ching and the roots are used in cases of ear-ache, and as a vermifuge.

II. microchilum n. sp.

Epiphytic glabrous. Stem about 2 feet long ¼ inch thick. Leaves 5 flaccid lanceolate acuminate dark green, tapering towards the base 9 inches long by two wide, ligule papery lanceolate acute ⅛ inch long. Raceme cylindric nodding 3 inches long covered with thin sheathing leaves (bracts) each containing 2 flowers. Bracteole exceedingly thin ¼ inch. Calyx thin and papery tubular dilated above, apex acute, 1½ inch long. Corolla tube slender 2 inches long yellowish white, terete, lobes linear convolute or spirally twisted acute apple green ¾ inch long. Lip very small orbicular retuse white ⅛ inch long. Staminodes oblanceolate obtuse white ⅝ inch long ¼ inch wide. Stamen very short, filament thick ¼ inch long, orange, anther as long dorsifixed curved, cells linear, with a deep groove between them, orange. Stigma elongate ovoid-triangular with a V shaped ridge at the base, deep green and hairy. Capsule oblong an inch long orange, splitting into three lobes and showing the numerous seeds enclosed in a red aril.

Java. Obtained with Vanda tricolor and cultivated. Flowers in August. Absolutely unique in the exceedingly rudimentary lip, and short filament. The plant appeared grow-

ing out of a tuft of Vanda, planted on a tree in the gardens.

H. crassifolium Baker. Fl. Brit, Ind. p. 228. I know nothing of, nor indeed by the description do I see anything to distinguish it by from *H. longicornutum* except that its bracts are said to be glabrous and not hairy. It was obtained in Perak by Dr. King's collector.

H. macrorrhizum n. sp.

Epiphytic, rhizome branched thick resembling that of ginger. forming a large mass on the tree. Roots thick terete. Stems about a foot tall, $\frac{1}{4}$ inch through. Leaves lanceolate acute glabrous eight inches long by two wide tapering to a short petiole below, ligule short, obtuse. Spike nodding lax about ten inches long. Bracts oblong obtuse one inch long $\frac{1}{4}$ inch wide about 12, distant green hairy at the base. Flowers two or three in each. Calyx narrow pubescent cylindrical nearly one inch long with two very short teeth. Corolla tube very slender $1\frac{1}{2}$ inch long, lobes very narrow linear, one inch long. Staminodes similar. Lip narrow deeply bifid, lobes lanceate curved about $\frac{3}{4}$ of an inch long, all white. Stamen slender $1\frac{1}{2}$ inch exserted. Anther very narrow linear. Style shorter than the stamen.

Selangor on a lofty fallen tree. Pahang track, 15th mile.

H. denticulatum n. sp.

Terrestrial. Stems tufted about two feet tall numerous. Leaves lanceolate acuminate glabrous with small thornlike processes along the edge 8 inches long or more, 3 inches wide, petiole $\frac{1}{2}$ inch long, sheaths finely hispid ribbed. Panicle terminal about a foot long branches short three flowered. Calyx brown papery tubular unequally bilobed $\frac{1}{2}$ an inch long. Corolla tube straight cylindric. Dorsal petal narrow linear involute, apex cupshaped, pinkish, lower part green, $\frac{1}{2}$ an inch long, lateral petals linear spathulate deflexed adnate to the lip at the base. Lip narrowly dilated at the apex and ending in three lobes, the lateral lobes curved forwards, the middle one bifid, all toothed, base of lip channelled, edges thickened red, the rest green. Staminodes narrow linear shorter than the petals red. Stamen long rather thick arched white pubescent nearly twice as long as the upper petal. Anther large oblong, pinkish. Style a little

longer. Capsule globose $\frac{1}{2}$ an inch long crowned with the calyx.

Dindings in woods at Lumut, abundant flowering in July. This is perhaps the least showy species in the genus, but is not wanting in interest. The peculiar dorsal petal, terminated by a conical cap, the narrow linear lip deeply channelled and ending in a broad three-lobed toothed limb, and the thick arched stamen, make it very distinct from any known species. The flower resembles some curious insect. When dry the leaves are rough and scabrid. The capsule resembles more that of an *Alpinia* than that of a *Hedychium*.

H. collinum n. sp.

Terrestrial, a low tufted plant about 2 feet tall, with fairly stout stems. Leaves broad lanceolate acuminate cuspidate glabrous, six inches long by three broad, ligule oblong rounded at the tip one inch long and $\frac{1}{2}$ an inch broad, spike rather lax nodding six inches long. Bracts oblong truncate quite obtuse about 20 on a spike, one and a half inch long, and half an inch wide. Flowers in pairs in the bracts. Calyx slender cylindrical $1\frac{1}{2}$ inch long. Corolla tube twice as long, lobes linear narrow. Staminodes broader linear $1\frac{1}{4}$ inch long. Lip cuneate bilobed, lobes divaricate tapering shorter than the staminodes, all white. Stamen very slender red, twice as long as the lip. Anther very small reniform with the basal points incurved.

Kedah Peak at an altitude at 4,000 feet.

This plant has somewhat the habit of *H. spicatum* Ham. but the stamen is very much longer than the lip.

H. coronarium Koenig, mentioned as occurring in Malacca in the Flora of British India is only so far as I have seen cultivated in the Malay peninsula.

CAMPTANDRA n. gen.

Herbaceous glabrous plants with a very small rhizome, stems erect one or few, leaves few ovate petiolate. Flowers several enclosed in a terminal green spathe, showy fugacious white or violet shortly pedicelled. Calyx tubular three-lobed, lobes equal. Corolla tube slender long, lobes lanceolate or oblong. Lip obovate bilobed. Staminodes large obovate petaloid.

Stamen projecting beyond the tube. Anther long slender curved dorsifixed versatile, the base prolonged into two parallel processes, the upper part only polliniferous. Style slender, stigma capitate. Capsule oblong, seeds numerous small curved fusiform aril laciniate. Two species occurring only on hills in the Peninsula and in Borneo. These plants have been referred to the genus *Kæmpferia*, but though allied they are very distinct in the peculiar arrangement of the anther quite unique in the order. As in Kæmpferia the lip and staminodes are the showy part of the flower, being broad and petal like. On the lip at the base are two keels with a groove between leading to the tube which contains the honey. The anther is curved and narrow and fixed by the back on the filament so that it swings readily, and the lower part is prolonged into a pair of long spurs. When a bee visits the flower it follows up the groove of the lip to insert its proboscis into the tube, and as its head touches the processes of the anther and pushes them back it brings down the upper part of the anther (where alone is any pollen,) and the stigma upon its back. Of course on visiting another flower the same thing occurs, and the pollen of the first flower is brushed off by the stigma of the second and so the flower is fertilized. Unlike Kæmpferia the Camptandras often set fruit, although the flower is open only for a few hours in the morning. This is doubtless due to the more certain working of this neat though simple mechanism.

C. parvula n. sp. *Kæmpferia parvula* Bak. l.c. p. 233.

A small herb about six inches tall. Stems several covered with sheaths below, leaves 4 or 5 ovate acuminate oblique, and unequal sided dark green, base broad, 2 to 3 inches long one inch wide, petiole slender an inch long. Spathe ovate acute an inch long. Flowers small, 1 inch across. Calyx $\frac{1}{4}$ inch long tubular green, lobes very short. Corolla tube half an inch long white, lobes oblong truncate mucronate. Lip oblong orbicular bilobed crenulate white, with an ocre patch on the ridges and some pink marks in the mouth. Staminodes subspathulate broad crenulate $\frac{1}{2}$ an inch long white. Anther curved crescent-shaped, moveable. Stigma subtriangular. Capsule oblong thin $\frac{1}{2}$ an inch long, seeds numerous small fusiform

curved, dotted black with an aril of whitish linear processes. Common on rocks and banks at 2000—4000 feet.

Selangor; Bukit Kutu. Pahang, Tahan river. Penang, Goverment Hill. Perak, Thaiping Hills, Bujong Malacca, Goping (King 823). Tomoh (Machado).

Var. angustifolia.

Leaves lanceolate acuminate, 3 inches long by $\frac{1}{2}$ to one inch base narrowed into the petiole, petioles longer and more slender.

Borneo, Sarawak, near Matang (Haviland, cm. m. i.)

C. lalifolia. n.sp.

Stem two feet tall or less, succulent. Leaves 1 to 4, cordate acuminate 5 inches long and 2 inches wide dark smooth, petiole one inch purple. Spathe ovate green an inch and half long. Flowers several white or violet showy, Calyx tubular three-lobed spotted red. Corolla tube $1\frac{1}{2}$ inch long white, lobes lanceolate obtuse white. Lip orbicular bilobed $1\frac{1}{2}$ inch across white or violet, the ridges at the base yellow. Staminodes oblong obovate rounded white or violet. Anther long narrow curved, base bifid translucent. Capsule oblong fawn-coloured $\frac{1}{2}$ inch long, seeds numerous.

Perak. Bujong Malacca; 3000-4000 feet alt, fl. Sept. on rocks or the ground. Without locality (Dr. King, No. 7219.) This is a very much larger and succulent plant. It has a very short rhizome and the stems are usually solitary, somewhat thickened at the base. The flowers are large and vary from pure white to violet. They last only a few hours. The seed often germinates in the spathe.

KÆMPFERIA.

Hardly any species of this genus have yet been found wild within our boundaries, though some kinds occur in the Lankawi islands and in Southern Siam. A few however are cultivated as spices by the Chinese and occasionally turn up in waste ground.

The genus if confined to the original *K. rotunda* L and its allies is a fairly distinct one, but unfortunately, *Gastrochilus panduratа* was described by Roxburgh as a *Kæmpferia* and

later botanists added more of this very distinct genus, so that it was absolutely proposed to amalgamate the two. The genus *Kæmpferia* may be thus defined. Herbs with an underground rhizome often tuberous and aromatic, stem short or produced, rarely absent. Leaves thin in texture few or several. Inflorescence spicate subterminal with thin lanceolate bracts. Flowers showy thin textured and very fugacious, opening singly violet or white. Calyx short cylindric. Corolla-tube long slender lobes narrow linear inconspicuous. Staminodes very large rounded horizontal clawed, forming with the rounded bilobed lip a nearly circular flower. Stamen short thin flat with a long narrow petaloid crest. Anther thin and usually concealed in the tube, linear not versatile and dorsifixed. Style slender. Capsule (rarely produced) oblong thin walled.

Distribution: India, Burmah, Siam and Cochin China.

The thin flat staminodes usually of the same color as the lip and lying in the same plane form the conspicuous part of the flower, the petals being much smaller and usually reflexed, hidden behind the staminodes and lip. The entrance to the nectary is very small and is partly blocked by the crest of the anther.

The genus can readily be divided into sections, *viz.* 1. Sincorus (Horan) stem very short, flowers appearing with the leaves. This includes *K. Galanga* L sometimes cultivated here by the Chinese: *K. marginata* Carey. *K. speciosa* Bak. *K. Roscoeana* Wall; natives of Burmah. *K. elegans* Wall. Siam (Curtis.) and Burmah. *K. angustifolia* Roxb. Bengal, also Siam (Dr. Keith.) *K. ovalifolia* Burmah and Siam, also collected in Malacca by Col. Farquhar according to Baker, but doubtless cultivated there. *K. pulchra* Ridl. Lankawi and Siam. *K. glauca* Ridl. Siam. *K. undulata* Teysm, locality unknown.

Sect 2. *Protanthium.* Leaves and flowers appearing at different times, including only *K. rotunda* L "*Kunchur*" of the Malays only cultivated here, and *K. candida* Wall. of Burmah.

Sect. 3. *Monolophus*; with an erect rarely prostrate leafy stem. *K. linearis* Wall, *K. secunda* Wall. *K. sikkimensis* King of India. *K. macrochlamys* Baker of Burmah and *K. decus-sylvae* Hallier of Borneo, a peculiar prostrate form.

Sect. 4. *Stachyanthesis* with a leafy stem and flowers in a long spike. *K. scaposa* Benth. India.

Excluded from the genus are *K. pandurata* Roxb., *K. Prainiana* King, *K. concinna* Bak. *K. parviflora* Wall. *K. anomala* Hallier, all of which belong to the genus *Gastrochilus* as probably do *K. involucrata* King, *K. Andersoni*, and *K. siphonantha* Bak. from India and Burmah, and *K. purpurea* Koen. (Retz observ. iii. 57) Junk Ceylon. *K. parvula* King is *Camptandra parvula* Ridl.

K. pulchra n. sp.

Leaves two ovate blunt spreading out usually flat on the ground, blade seven inches long by five inches across, petiole short, three inches long, dark olivaceous black with grey markings above. Inflorescence between the leaves, peduncle three inches long green terete, spike sub-cylindric one inch long covered with persistent convolute bracts, the outer one brown and ribbed the inner ones about 20, thin white, lanceolate. Flowers numerous produced singly at considerable intervals of time, thin fugacious. Calyx very thin tubular. Corolla tube about an inch long very slender white, lobes linear obtuse white reflexed $\frac{1}{2}$ an inch long. Staminodes and lip connate below. Staminodes obovate as long as the lip obtuse, mauve. Lip deeply bilobed, lobes oblong apices rounded $\frac{1}{2}$ an inch long, mauve with the base pale yellowish white. Stamen, filament very short. Anther narrow oblong, crest very long linear apex entire rounded recurved. Style much shorter than the appendage and projecting but little beyond the anther, stigma two lipped, lower lip prolonged.

Siam. Bangtaphan very common in dry places. (Dr. Keith). Lankawi (Curtis). This pretty plant which has long been cultivated in Singapore is nearly allied to *K. Roscoeana* Wall, but differs in the mauve not white flower, and the remarkably long entire anther appendage which is longer than the rest of the stamen. The anther and style are hidden in the tube, being much shorter.

K. glauca n. sp.

Leaves 3 unequal orbicular cuspidate, the largest five inches long by three wide, glaucous green. Flowers numerous in a spike almost hidden between the leaves. Bracts lanceo-

late acuminate about an inch long, narrow, spotted with red. Calyx one inch long tubular spathaceous entire spotted red, Corolla tube cylindric two inches long, $\frac{1}{8}$ inch thick pale violet, lobes lanceolate cuspidate $\frac{1}{2}$ an inch long $\frac{3}{16}$ inch wide, white spotted with red at the tip. Lip orbicular cleft nearly to base, inner edges straight violet with a white spot at the base, one inch across. Staminodes orbicular narrowed at the base $\frac{1}{2}$ an inch long and wide, violet. Stamen, with the anther entirely outside the tube nearly $\frac{1}{4}$ inch long, cells parallel rather fleshy pollen white, crest large reniform recurved broad entire violet. Style longer than the anther purple. stigma capitate deep red purple. Siam, Kasum, (Curtis).

This curious and pretty plant grows abundantly on the limestone rocks of Kasum, the rhizomes being imbedded so deeply in chinks of the rock that it is necessary to break away the rock to get at them. The gray green leaves and violet flowers make it an attractive plant. Structurally its most remarkable point is that the anther projects outside the tube entirely, instead of being concealed within as in the case of *K. elegans*, etc, and the style is also visible from the outside.

GASTROCHILUS.

This genus was first distinguished by Wallich who described two species from *Kæmpferia* as it then stood by the lip being saccate or basin shaped, and by the habit. This form of the lip is peculiar to a few species only of the plants which I would refer to the genus, and which as I have already said is very distinct from the true Kæmpferia. The genus may be thus defined. Small herbs with a short rhizome. Stem tall and leafy or short. Leaves usually several together lanceolate or ovate. Inflorescence spicate with large bracts sometimes colored springing from the axils of the leaves, or independently on the rhizome or terminal when the stem is tall. Flowers thin white, yellow or red. Calyx tubular. Corolla tube rather long slender lobe oblong or lanceolate. Staminodes similar but slightly longer erect. Lip oblong or obcuneate entire or three lobed. Stamen thick and fleshy with an oblong anther, the crest of which is small rounded or lobed.

Distribution : India, the Malay peninsula and islands.

The species can be divided into three groups. *Acranthi*, in which the flower spike is borne on the top of a leafy stem ; *Mesanthi* from the centre of a leaf tuft ; and *Exanthi* outside the leaf-tuft. The last group suggests a close affinity with the Curcumas, of the section Hitcheniopsis, the real difference being the shape of the bracts and their more cone-shaped arrangement. Indeed *C Kunstleri* might almost as well be put in Gastrochilus as in Curcuma. *Scaphochlamys* described by Baker and referred to the neighbourhood of *Elettariopsis*, is truly a Gastrochilus, though in some respects a curious form.

The *Gastrochili* inhabit woods, and though the species are usually local, that is to say restricted in area, they usually occur in quantity when met with. The flowers, which are very delicate and pretty, often sweet scented, open one at a time about midday, withering towards evening. They very rarely produce fruit. Many species are well worth cultivating, and grow readily in pots, or in shady spots in the ground.

As the genus has been so much confused with *Kempferia* I submit a list of all species known to me with localities.

§ *Acranthi.*

G. pulcherrima Wall. India and Siam,

G. rubrolutea Bak. India.

G. ochroleuca Ridl. Siam.

G. albosanguinea Ridl. Perak.

§ *Exanthi.*

G. Prainiana (Bak). Perak.

G. tillandsioides Bak ? Perak.

G. concinna Bak. (sub Kæmpferia) Perak.

G. calophylla Ridl. Selangor.

G. oculata Ridl. Selangor.

G. biloba Ridl. Pahang.

G. Hallieri Ridl. **Kæmpferia anomala* Hallier Bulletin Herb. Boissier. VI. p. 357 pl. 10.

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* There being nothing anomalous in this plant, I have taken the liberty of altering its specific name as well as its generic one.

§ *Mesanthi.*

G. longiflora Wall. India.

G minor Bak. Perak.

G. scaphochlamys Ridl. Malacca.

G. lancifolius Ridl. Johor.

G. longipes King. Perak.

G. Curtisii Lankawi.

G. clivalis Ridl. Selangor.

G. angustifolia Hallier. Peli, Sumatra.

G, pandurata Ridl. India.

G. parviflora (Wall.) (sub Kæmpferia) Burmah.

G. involucrata (Wall.) India.

G. Andersoni (Bak) Burmah.

G. parvula Wall. India

G. ochroleuca n. sp.

Stem over a foot tall. Leaves distant lanceolate acuminate base broad inequilateral 5 inches long over one inch wide, petiole one inch, sheaths $1\frac{1}{2}$ to 2 inches long, ligule short rounded, spike terminal short, shorter than the upper leaves. Bracts lanceolate acute deep green. Flowers nodding. Calyx cylindric, as long as the blunt bracteole. Corolla tube twice as long cylindric, lobes oblong lanceolate blunt $\frac{1}{4}$ inch long. Staminodes broader much shorter than the lip white. Lip obovate nearly flat $\frac{3}{4}$ inch long by half an inch wide submucronate, yellowish white with an orange spot on the central bar. Stamen shorter than corolla-lobes, fairly stout cylindric, anther linear crest short, style thick decurved stigma large.

Siam. Between Kasum and Pungah. Flowered in Penang gardens Nov. 1896. (Curtis).

K. pulcherrima Wall. Pl. Asiat. Rar. 122 t 24. A native of Burmah and Siam is recorded from Penang (Maingay) in the Flora of British India. This must surely be a mistake.

G. longiflora Wall. l.c. 25, is also recorded from Malacca

without collector's name. I have seen no specimen.

G. albo-sanguinea n.sp.

Plant 12-18 inches tall, stem leafy. Leaves about six oblong lanceolate acuminate bases broad rounded, blade eight inches long, by $2\frac{1}{2}$ across, glabrous, petiole rather slender two inches long, sheaths about six inches. Spike central shorter than the upper leaves about five inches long. Bracts lanceolate acute closely appressed. Calyx spathaceous $\frac{1}{4}$ inch long truncate. Corolla tube one inch long, hardly longer than the bracts, lobes linear incurved white. Staminodes porrect, and curved up overlying the upper edges of the lip, oblong obtuse, white with a pink tinge. Lip saccate white with an everted red margin about $\frac{3}{4}$ inch long. Stamen slender, filament fairly broad flattened. Anther linear half an inch long, crest none.

Perak, on Maxwell's Hill, collected by Mr. F. A. Wooldridge and flowered in the Botanic Gardens, Penang, September 1894.

This pretty plant is distinguished by the lip being narrowed at the base with the sides turned up and the edges turned out and down. The staminodes lying along the upper edge of the lip enclose it so that a bee or other insect must creep in so as to get at the honey.

The plant is very closely allied to *G. pulcherrima* Wall. differing in the more convolute lip and longer petioled leaves. An exceedingly similar if not identical plant occurs also in Lankawi (Curtis 2677).

G. minor Bak. Fl. Brit. Ind l.c. 217.

Rhizome very short, leaves about 4 in a tuft oblanceolate obtuse about 4 inches long, $1\frac{1}{4}$ across, dark green with a central silvery bar, petiole about an inch long, sheaths red. Spike short from the centre of the leaves. Bracts yellowish. Flowers large and showy. Calyx tubular. Corolla tube not longer than the bract, lobes oblong obtuse yellow. Staminodes oblong obtuse yellow with red spots at the base. Lip an inch long $\frac{1}{2}$ an inch across, flat, oblong obtuse with a central keel running the whole length and bifurcating at the apex yellow darkest towards the apex with crimson spots at the base. Stamen long pink, filament

linear thick arched, anther somewhat broader cells divaricate at apex, crest rounded obscurely three lobed, rather small. Style slender shorter than stamen. Stigma cuneate, stigmatic surface terminal.

Perak. Batang Padang (Curtis); Bujong Malacca abundant; Larut (King's collector).

A very pretty plant with its dark green and silver barred foliage. The name given to it is not very suitable as it is larger than a good many species, and has the largest flowers of any. The flat lip and arched stamen are peculiar points in it.

G. Scaphochlamys n. sp. *Scaphochlamys Malaccana* Bak. Fl. Brit. Ind. p 252. Rhizome creeping long with stout roots. Leaves in tufts of two or three, with a few sheathing at the base lanceolate inequilateral acute or blunt, dark green, six or seven inches long 1½ inch broad, pubescent, especially along the midrib, petiole 3-4 inches long pubescent. Scape central 5 to 9 inches long, pubescent. Bracts spiral lingulate blunt green with red sheaths, pubescent one inch long ½ inch wide. Flowers white, with a yellow bar on the lip, sweet-scented.

Corolla tube slender one inch long, lobes oblong lanceolate ½ inch long. Staminodes as long and similar. Lip obovate undulate bilobed. Stamen broad white, anther cells narrow, crest very large and orbicular. Style shorter than the crest.

Malacca. Woods on Mount Ophir, (3141); Bukit Muar (Feilding).

The chief peculiarity of this plant is the curious spirally arranged bracts which gradually spread out as the spike develops. The rhizome too is more widely creeping than is usual, otherwise the plant is quite normal.

G. lancifolius n.sp.

Rhizome rather slender. Leaves in pairs lanceolate acuminate acute inequilateral, blade 7 or 8 inches long by 2 inches wide glabrous, petioles five inches long, sheathing for about half their length. Spike central 3 inches long zigzag with 5 or 6 green oblong cuspidate distant bracts ½ to one inch long. Flowers rather small yellow, three in a bract. Calyx short tubular ¾ inch. Corolla tube long and slender one inch long, lobes linear ¼ inch. Lip half an inch long bilobed, lobes rounded. Staminodes ob-

long rounded nearly as long as the corolla lobes but broader. Anther with linear parallel cells, crest large broader than the anther broadly cuneate shortly three-lobed.

Johore. Kwala Sembrong (Lake and Kelsall 1892).

This is most nearly allied to *G. scaphochlamys* Ridl. but has smaller bracts, and flowers with longer corolla tubes, and a different crest.

G. longipes King and Prain mss.

Rhizome rather far-creeping. Leaves two, blade elliptic ovate eight inches long by four wide subacute glabrous, petiole 9 inches long, 3 inches sheathing. Spike central 2 inches long. Bracts narrow lanceolate few and long. Corolla tube long and slender, lobes lanceolate half as long as the lip. Lip entire oblong apex rounded edges crisped and thickened central bar much thickened $\frac{1}{4}$ inch long. Staminodes broader than corolla lobes, and longer than the lip. Stamen, filament rather slender, anther oblong, crest rather large oblong rounded. Style considerably longer. Stigma broadly obconic.

Perak. Briah, Larut (Wray 4220).

This resembles *G. lancifolius* in the form of the spike and the flower especially in the entire crisped lip. The foliage however is very distinct at two leaves being very large and broad with very long petioles. The long decurved style projecting some way beyond the anther is unusual but is matched in *G. Curtisii*.

G. Curtisii Baker. Bot. Mag. t. 7363.

Leaves four in a tuft, blade ovate oblong acute, 5 inches to a foot long, two to six inches across, bright green pubescent on the back, petiole stout six inches long, sheaths broad about 2 inches long purplish. Spike central shorter than the petioles about an inch long. Bracts oblong, white, as long as the calyx. Calyx tube white cylindrical, lobes lanceolate acute pubescent, one inch long. Corolla tube two inches long cylindric dilated a little at the top, lobes oblong lanceolate one inch long. Staminodes a little shorter, all white. Lip longer oblong obtuse flat, yellowish cream with red marks on the sides. Stamen, filament cylindrical pubescent, anther short and thick, crest short broad

truncate. Style considerably longer thick above the anther, stigma cup-shaped.

Lankawi Islands on limestone rocks, (Curtis 2896).

The most peculiar point about this plant is that the anther cells apparently open at the top only and do not split for their whole length as is usual. There is a large depression behind the anther formed by the broad and short crest from which the long style protrudes. The back of the leaves are pubescent, and in the picture the upper surface is represented so also, but I do not see any hairs here in the specimen, nor are they mentioned in the description.

G. cliva'is n. sp.

Rhizome rather slender with long roots. Leaves 3 or 4 in a tuft, ovate to lanceolate acute narrowed at the base into the petiole inequilateral $4\frac{1}{2}$ to 8 inches long and 2 inches wide, petiole 5 or 6 inches long sheathing for about 3 inches, all glabrous except about the midrib on the back which bears scattered hairs. Spike central 3 inches long, enclosed in the sheaths. Bracts long and narrow containing four or five flowers each with two long narrow linear acute transparent bracteoles one inch long and $\frac{1}{8}$ inch wide. Calyx tube very narrow half an inch long, with three lanceolate lobes, two longer than the third. Corolla tube slender dilated a little upwards 2 inches long, lobes linear $\frac{1}{2}$ an inch long by $\frac{1}{8}$ inch wide. Lip oblong entire apex rounded, crisped, median bar thickened. Staminodes of the length of the corolla lobes but broader and blunt. Stamen filament rather slender, anther oblong thick with an oval crest longer than the club shaped stigma.

Selangor, Pahang Track, 15th Mile, on banks.

G. pandurata. Ridl. *Kæmpferia pandurata.* Roxb. Asiat. Res. XI. 320 t. 2.

The "Temu Kinchi" of the Malays is sometimes cultivated here, the rather stout rhizome which is yellow inside and very aromatic being used in medicine. It is probably a native of India. The leaves are about 5 in a tuft oblong ovate with a broad base and long petiole. The spike is short and central. The flowers are white or pink, lip saccate white with pink spots.

G. Prainiana n. sp. *Kæmpferia Prainiana* Bak. l.c. 220.

Leaves lanceolate acute 8 inches long $1\frac{1}{2}$ wide, pubescent on the back with a petiole of equal length and a long slender spike of many imbricate bracts, rising directly from the rhizome about 9 inches tall. Flowers red and white. Corolla tube an inch long, lobes $\frac{1}{2}$ an inch oblong ascending, lip oblong cuneate much longer.

Perak, Goping, (King's collector, No. 226.)

My specimen has no flower, but the plant is very distinct in its long sessile cylindric spike. It should be sought again in the Kinta valley.

G. tillandsioides. Bak. l.c. based on a drawing made by Kunstler from a plant probably collected in Perak, I have not seen, and as far as description goes I see but little difference between it and the preceding.

A very curious plant I found at the base of Gunong Panti in Johore, has unusually large leaves ovate glabrous 9 inches long and 6 across, petiole 7 inches and one or more cylindric imbricated spikes in the centre, 6 inches long, the bracts $1\frac{1}{2}$ inch long. I could find no trace of flowers, but imagine it belongs to this genus and if so is by far the largest species.

G. calophylla n. sp.

Rhizome short rather slender. Leaf solitary obovate rounded rather thick six inches long and four across, deep bluish green above with a white feather on each side, rosy pink beneath, petiole two inches long or more channelled rather stout. Inflorescence close to the leaf and enclosed with the petiole in a red sheath, about as long as the petiole. Bracts narrow lanceolate red, blunt with a minute point, $\frac{3}{4}$ inch long rolled round the base of the flower, two to each spike. Spikes six in the inflorescence, on a peduncle an inch long. Calyx tubular very short. Corolla tube one inch long lobes lanceolate acute $\frac{3}{4}$ inch long. Staminodes much shorter oblong obtuse rounded. Lip obovate bifid at the apex. All white except for a stain of pale yellow in the centre of the lip. Stamen short, anther oblong pubescent, crest broader than the anther rounded retuse. Stigma cup-shaped.

Selangor. In thick woods on the Pahang track. Flowered in May.

This is a very pretty foliage plant and one well worthy of cultivation. The deep blue green leaves with the white band on each side and deep rose pink backs make it very attractive.

G. concinna n.sp. *Kæmpferia concinna.* Baker. Fl. Brit. Ind. l.c. 221.

Rhizome slender. Leaf solitary, petiole very long and slender 9 inches tall, blade lanceolate acuminate with a broad cordate base six inches long, one and a half broad glabrous. Scape three inches long, peduncle one inch long enclosed with the base of the petiole in two sheaths, one longer than the scape. Bracts lanceolate acute rather thin glabrous red one inch long. Calyx very short. Corolla tube slender longer than the bracts, gradually dilated to the throat, lobes white with dark red stripes. Lip oblong margins incurved. Anther crest small entire.

Perak. Ulu Bubong. (Dr. King's collector 10135).

I have only seen dried specimens of this, and those in not very good condition. Its most striking point is the remarkable length of the slender petiole and the cordate base of the leaf.

G. biloba Ridl. Trans. Linn. Soc. Vol 3. 379.

Rhizome long slender. Leaf solitary, petiole six inches long pubescent, blade lanceolate to elliptic oblong obtuse 6 to 8 inches long, 3 to $3\frac{1}{2}$ broad, base rounded, dark green with silvery bands above, purplish beneath, midrib pubescent. Scape lateral base of peduncle enclosed with base of petiole in a long narrow sheath 4 inches long. Peduncle 2 inches or less. Spike one inch long. Bracts lanceolate acute dark red. Bracteoles 2 lanceolate thin. Calyx $\frac{1}{2}$ an inch long tubular dilated upwards, pale with red transverse bars and short obtuse lobes. Corolla tube $1\frac{1}{4}$ inch long slender white, lobes lanceolate acute reflexed $\frac{3}{4}$ inch long $\frac{1}{4}$ inch wide white. Lip oblong bilobed, lobes rounded obtuse nearly an inch long $\frac{3}{4}$ inch wide white tinted with pink. Staminodes more oblong $\frac{1}{2}$ an inch in length obtuse white, anther oblong wide, cells narrow linear, crest rather large rounded ovate sul acute.

Pahang at Kwala Tenok; Tahan river. July 1891.

G. oculata n.sp.

Rhizome rather long creeping. Leaf solitary ovate glabrous 8 inches long by $4\frac{1}{2}$ wide, dark green, purplish beneath, prominent nerves about 14, petiole 10 inches long or less. Scape short lateral, peduncle 1 inch long enclosed in the sheath with the base of the petiole. Spike $1\frac{1}{2}$ inch long. Bracts ovate to lanceolate $\frac{1}{2}$ an inch long red, lower ones blunt, upper ones acute. Flowers 2 in a bract. Calyx $\frac{1}{2}$ inch long, lobes 2 very short. Corolla tube an inch long slightly dilated upwards, lobes lanceolate acute $\frac{3}{4}$ inch long. Staminodes oblong lanceolate obtuse broader, pubescent $\frac{1}{2}$ inch long white. Lip obovate bilobed, $\frac{1}{2}$ an inch long and as wide white, centre yellow and 2 deep crimson patches at the base. Stamen filament short and broad, anther thick, cells divaricating with a deep groove between, pubescent, crest very short rounded.

Selangor, Pahang track on banks at about 1500 feet altitude.

CURCUMA.

The Turmerics are not very strongly represented in the Malay Peninsula. The head quarters of the genus lying further north in Northern India and Burmah. Very few occur in the Malay islands and of those that do it may be doubted whether most of them are not aliens. The genus is closely allied to *Gastrochilus* chiefly differing in the cone-like flower spike with very broad bracts, the upper ones often differently colored from the lower ones, and as long or longer than the flowers. The rhizome is usually stout and strongly aromatic and bears tubers either sessile or on long stalks, but in the species which frequent our damp and shady jungles it is more slender, and often produces no tubers. Indeed these fleshy tuberous rhizomes appear to be adapted for food stores during the dry seasons, and thus as there are no dry periods in the Malay jungles they are unnecessary. The leaves are borne in tufts on the rhizome and are from two to six or more in a tuft, usually oblong, or oblong ovate with long petioles. The flower spikes are in all our native species produced in the centre of the leaf-

tuft, an l thus belong to the section *Mesantha* of Horaninow. One species of the section *Exantha* with the spike outside the tuft (*C. Zedoaria*) is commonly to be met with round villages, where it is cultivated. The flower spikes are borne on stout stalks and are shorter than the leaves. They have large and broad membranous bracts closely set, in the axils of which are two or more thin textured fugacious flowers, which project usually but little beyond the bract. The flowers open, one or two at a time upon the spike. The calyx is very short cylindrical and toothed. The corolla tube is usually slender enlarged upwards, the petals oblong or ovate oblong, the staminodes very similar and connate with the stamen. The lip broad rounded entire or more or less lobed. The anther, usually large, has in some species a small round crest, in others there is none. In many species it is spurred with curved processes, the use of which has been explained and illustrated by Forbes. (Wanderings of a Naturalist, p. 248) where he shows that they act as levers to rotate the anther upon the back of a bee when entering the flower in search of honey so as to deposit the pollen on its back. In these species the anther is moveable upon its filament, but in the other species there is nothing of this arrangement and the anther is not moveable. The fruit which is very rarely produced is a globose capsule with numerous seeds.

Several species are cultivated by the Malays, but except *C. longa* L. the turmeric, and *C. Zedoaria*, the Zedoary, only in small quantities, and as several kinds known by Malay names never seem to produce flowers, it is impossible at present to identify them. Of these Temu hitam, rather a small kind, has the rhizome light blue inside, and a taste of Turkey rhubarb, but somewhat bitter and slightly hot. The leaves are rather flaccid dark green and glabrous.

Temu lati, or Temu badoh, is a very much larger kind with deep green leaves the blade over two feet long and five inches wide with an obscure brownish mark in the upper part of the midrib, and the petiole winged, six inches long and half an inch through. The rhizome is very light blue inside and has a musky taste.

Temu pauh has a yellow rhizome with a smell and taste of wild carrots.

C. Zedoaria Roscoe, Scitamineæ. t. 109. *Curcuma zerumbet* Roxb. As. Res. XI. 333. *C. Sumatrana* Miq. Fl. Sumatra. p. 615.

Rhizome large with oblong rounded tubers, orange colored inside. Leaves in pairs $1\frac{1}{2}$ foot long and six inches across lanceolate cuspidate glabrous bright green with a central purple brown bar. Scape outside the tuft of leaves, peduncle $1\frac{1}{2}$ foot long, $\frac{1}{4}$ inch through covered at the base by a sheath six inches long, green with an obtuse apex, and cleft to the base. Spike six inches long or more, with about twenty bracts, the lower ones green more or less tipped with pink, the terminal ones lanceolate deep crimson thinner in texture; the lower ones two inches long and $1\frac{1}{2}$ inch wide rather soft quite blunt and rounded. The flowers are four to each bract. Bracteoles thin transparent white hardly an inch long lanceolate. Calyx thin transparent with a ring of erect hairs at the base, $\frac{1}{4}$ inch long, bifid slightly hairy all over, apices rounded. Corolla tube an inch long funnel-shaped yellowish white, the lobes half an inch long pure white, thin, $\frac{3}{8}$ inch across, the upper one mucronate. Lip obovate oblong over one inch long dilated towards the apex, which is bifid, pale yellowish with a thicker central bar; the apex orange with a faint purple line along each side of the bar. Staminodes oblong larger and stiffer than the petals obtuse erect. Stamen filament for the greater part adnate to the staminodes, ovate white, the anther mobile oblong squared pubescent, the basal processes horn-like acute; pollen white. Ovary nearly $\frac{1}{4}$ inch in length hairy. Style projecting beyond the stamen. Stigma transversely oblong.

The Zedoary is known to the Malays as Temu Lawas. It is frequently cultivated and often persists in waste land after cultivation is abandoned and seems to establish itself thoroughly. It frequently grows among lalang and generally flowers there, but it is not easy to flower it in a pot or in really good soil. It is a very handsome plant when in flower, and its foliage is also ornamental. It is said to be wild in the Eastern Himalayas and is cultivated all over the East.

Singapore, common. Penang, roadside near Balik Pulau. Kedah, Yan: Siam at Bangtaphan (Dr. Keith). Also Celebes at Minahassa (Koorders 19671.5)

C. longa L. Turmeric, "Kunyet," is often cultivated by Chinese, but I have never seen it establish itself anywhere as Zedoary does. It is a much smaller plant with light green leaves, and a short spike with pale green bracts at the base and pink ones at the top. The flowers are yellow.

C. grandiflora Wall. Baker Fl. Brit. Ind. l.c. 216. Malay Peninsula, Wallich. I have never seen anything like here. There is some doubt as to where the plant came from, but it was probably not collected in the peninsula.

C. (Hitcheniopsis) Kunstleri Bak. l.c. 214.

Rhizome horizontal rather stout. Leaves in pairs obovate cuspidate 12 inches long and six inches across above deep green shining ribbed, the back purple pubescent, keel thick channelled four inches long. Spike from between the leaves about four inches long broad shortly peduncled. Bracts few about an inch broad with rounded apices deep red; inner bracts shorter oblong ovate cartilagineous deep red. Flowers rather large protruded from the bracts. Calyx nearly half an inch long cylindric deeply split apex obscurely trifid red. Corolla tube an inch long enlarged upwards white; lobes lanceolate acute $\frac{1}{2}$ an inch long white. Staminodes oblong obtuse striate white pubescent. Lip obovate obtuse denticulate apex bilobed, base channelled. edges of channel elevated, yellow darker in the centre and at the base with a few pink streaks. Stamen pubescent with a broad filament, anther oblong $\frac{1}{4}$ inch long emarginate. Stigma small rounded and beaked. This plant grows in dense damp jungles often in great masses. The leaves are usually purple on the back, but sometimes all green. It is very easy to grow and flowers readily. The structure of the flower is quite that of a Gastrochilus, from which genus it really chiefly differs in the large broad bracts like those of other *Curcumas*.

Perak. Thaiping Hills (Curtis, Wray No. 3702, 3662, 3388) Tapa (Wray 193) Dindings on Gunong Tungul.

Var. rubra. Staminodes and lip and anther dark yellowish red.

Perak. Kwala Dipang, at the base of the limestone cliffs.

C. sylvestris Ridl. Trans. Linn. Soc. vol. 3 p. 378.

Rhizome slender creeping for some distance. Leaf solitary with a slender petiole 1½ feet long, blade ovate acute eight inches long four and a half inches wide, green above purple beneath, glabrous. Scape slender four to six inches long close to the leaf and enclosed with the petiole at the base by a large sheath ; spike obconic 1½ inch long. Bracts broad ovate with the points recurved rosy. Flowers small white. Corolla with a slender tube ½ an inch long, lobes narrow linear acute ½ an inch long. Lip oblong obovate emarginate, the lobes rounded white with a yellow central spot, and some violet streaks on the lobes. Staminodes broader than the petals lorate obtuse white. Stamen with a broad filament, anther oblong with the crest broad recurved obtuse dark violet, cells narrow linear.

Pahang, Tahan Woods.

C. parviflora Wall. Fl. As. Rar. 147. t 57. collected by Wallich near Prome in Burmah has been found by Dr. Keith in Siam.

CONAMOMUM n. gen.

Stout plants with a woody rhizome elevated above the ground. Leafy stems tall. Leaves oblong lanceolate. Scapes on the rhizome pedunculed with dense spikes of flowers, bracts stiff green or brown persistent. Calyx tubular with three equal regular lobes. Corolla tube short and thick, lobes unequal, the upper one largest oblong. Lip three-lobed or entire. Staminodes linear smaller than corolla lobes. Stamen short and broad, anther with curved linear arms above. Capsule subglobose or oblong.

These plants have the general habit of *Geostachys*, but possess free staminodes of some size, and the curved arms of the anther like those of *Amomum*.

C. citrinum. n. sp.

Leaves oblong lanceolate cuspidate, base acute a foot or more long, 3 inches wide, glabrous, midrib stout, petiole short winged, ligule ¼ inch long. Scapes several about 13 inches tall. Peduncle 8 inches long and nearly ¼ inch through, stiff with

numerous oblong truncate green sheathing leaves 2 inches long split almost to the base; spikes very dense many flowered. Bracts light green stiff ovate acute $\frac{1}{2}$ inch long. Bracteole broadly ovate nearly encircling the flower. Calyx shortly tubular thinly cartilaginous, with three equal lobes, $\frac{1}{4}$ inch long $\frac{3}{16}$ inch wide. Corolla tube short and thick, lobes elliptic oblong obtuse translucent white, upper one $\frac{1}{2}$ an inch long and $\frac{3}{5}$ inch wide, the lower ones shorter. Staminodes short linear from a broad base blunt pale red. Lip three lobed, lateral lobes erect rounded midlobe oblong obtuse rounded $\frac{1}{4}$ inch across, centre depressed thickened bright yellow with pale red stripes on the side lobes. Stamen $\frac{1}{2}$ an inch long, filament linear, anther dilate, with two curved linear arms $\frac{1}{8}$ inch long. All yellow spotted with red. Stigma clubbed with a narrow transverse slit. Capsule globose $\frac{1}{2}$ an inch long dark purple, seeds numerous.

Perak. Maxwell's Hill (No. 2959), Bujong Malacca (9788.)

C. utriculosum n. sp.

Rhizome very large elevated considerably above the ground on stout roots, thick. Stems about six feet tall clubbed at the base. Leaves lanceolate or oblong lanceolate cuspidate narrowed at the base, 16 to 18 inches long 2 to 4 inches wide, glabrous, petiole one inch long or less channelled, ligule oblong obtuse glabrous. Spike terrestrial on a stout peduncle six inches tall covered with loose stiff truncate leaves an inch and a half long, above densely floriferous, inflorescence 6 to 18 inches tall, outer bracts ovate acute dry, ribbed one inch long, $\frac{1}{2}$ inch wide. Inner bract utricular nearly as long, enclosing a single flower, six-lobed, and split nearly to the base on the inner face, lobes $\frac{1}{8}$ inch long acute. Calyx utricular longer than the corolla tube and shorter than the inner bract, 3 lobed lobes rounded obtuse. Corolla tube short and thick, lower lobes oblong obtuse thin punctate posticous one much broader rounded at the apex. Lip about as long, the claw broad, blade fan-shaped rounded buff yellow with red veins. Staminodes linear flat apex rounded. Stamen filament broad and thin three-veined rather short, anther cells thick linear, crest ovate rounded with curved linear lateral arms. Style longer, stigma funnel-shaped. Capsule oblong, fusiform one inch long. Seeds numerous black small.

Perak Hills. Maxwell's Hill. (Curtis 2714; Ridley 5190): Gunong Batu Puteh (Wray 1013).

Costus.

This genus has its headquarters in South America, and a number of species occur also in Africa. In Asia it is much rarer, though one species *C. speciosus* perhaps the finest in the whole genus occurs over the whole of tropical Asia. Two other species occur in the peninsula. It is one of the best marked genera in the whole order. The stems are tall and woody with the leaves arranged in a spiral, and in some species the stem itself grows spirally. Unlike any other genus except the allied *Tapeinocheilus* from New Guinea, the stems frequently branch. The ligule of the leaf forms a complete ring highest at a point nearest to the petiole, below which is sometimes a thin elevated ring fringed with hairs. The spike is terminal or rises directly from the rhizome with stiff sometimes spiny bracts. The calyx is tubular with usually distinct lobes. The corolla tube broad and no longer than the calyx, the lobes large lanceolate or oblong. There are no staminodes, nor stylodes. The lip is large obovate, and rolled into a trumpet shape.

The stamen is very broad and thin with the linear anther cells placed some way down and the apex curved up. The capsule is woody splitting on one side exposing a number of black angular seeds.

Costus speciosus Smith. Trans Linn. Soc. i. 249. Bak. l.c. 250.

C. arabicus Jacq. Ic. t. i. *Hellenia grandiflora* Retz. Observ. VI 68. *Banksia speciosa* Koen. Retz. Obs. iii. 75.

Stems about 10 feet tali and $\frac{1}{2}$ to one inch through covered with dull brown sheaths, often spiral, branched above. Leaves oblong acuminate cuspidate 9 inches long, 3 inches wide above dark green glabrous, beneath more or less pubescent, petiole $\frac{1}{4}$ inch long thick pubescent, ligule short surrounding the stem emarginate opposite the leaf ciliate reddish. Spike ovate or oblong terminal, very rarely from the rhizome attaining a length of six inches, many flowered, flowers solitary in the bracts large showy and fugacious. Bracts, ovate mucronate not pungent red $\frac{3}{4}$ inch long, upper ones smaller cartilaginous. Inner

bract ½ an inch long lanceolate acute keeled. Calyx short cartilaginous red, lobes very short, the two upper ones mucronate keeled, the lower one longer lanceolate not keeled, nor mucronate. Corolla tube very short hardly ¼ inch long lobes equal, mucronate 2 inches long and one across, white sometimes tinted with rose. Lip very large obovate convolute 4 inches long and as wide, white with a central yellow bar, and an orange spot at the entrance to the tube, the centra hispid. Stamen 2 inches long, the filament broad oblong thin ½ an inch wide, hairy on the back, connective prolonged into an oblong acuminate upcurved crest, orange beneath. Anther narrow linear ½ an inch long. Style rather stout 2 inches long glabrous. Stigma transversely oblong quadrate, slit narrow subterminal. Ovary glabrous three-angled red three-celled. Capsule coriaceous oblong red crowned with the persistent calyx ½ an inch long each cell splitting longitudinally. Seed angled black about ⅛ inch long 4 or 5 in each cell.

Var. *argyrophyllus* Wall. Cat. 6555. Baker l.c. 250.

A more slender woodland form with more branched pubescent stems, leaves pubescent at the back, bracts and calyx less brightly colored, often plain green, flower spikes much smaller, lip smaller with no yellow spot in the mouth, petals often tinted pink. This variety keeps true under cultivation, but is hardly distinct enough to constitute a separate species.

Another variation I have once met with bore the flower spike on the rhizome instead of on the end of the leafy stem.

I have also seen a form of otherwise typical *C. speciosus* with no yellow on the lip, and forms occur in which the flower is more or less tinted with pink.

The common form occurs in damp open places, the var. *argyrophyllus* in denser woods.

Singapore abundant, Johore, Tanjong Kupang; Tengarah (Feilding), Malacca, common, *var. argyrophyllus* at Lubok Kedondong, and Jasin, Ophir; and Sungei Hudang. Sungei Ujong. Bukit Tampin. Selangor, Kwala Lumpur, etc. Pahang, Tahan river, Chengei. Perak, Hermitage Hill (var. *argyrophyllus)* Penang. This is the plant known as S'tawa or Tawar by the Malays. It is used in various ceremonies.

C. globosus Bl. Enum. Pl. Jav. 62.

Stems tall rather slender woody 6 to 8 feet high, bases covered with thin reddish brown sheaths. Leaves on one side of the stem only, sheaths about an inch long terete, ligule annular apex fimbriate with hairs, petiole short $\frac{1}{4}$ inch long thick, blade broadly oblanceolate acuminate thin, 7 inches long by $2\frac{1}{2}$ inches across dark green above lighter beneath, nerves above conspicuous with transverse reticulations glabrous above, midrib pubescent or not. Spike from the rhizome on a short thick woody horizontal or ascending peduncle 3 inches long and half an inch thick, compact many flowered three inches long and half an inch thick, prickly from the sharp points of the bracts. Bracts stiff cartilagineous broadly ovate with a sharp stiff mucro half an inch long striate red covered with short blunt processes, an inch long including the point. Flowers solitary in the bract, large and showy, but fugacious, cherry red. Bracteole like the bract but inequilateral and smaller. Calyx tubular cartilaginous with three equal pungent mucronate lobes an inch in length pubescent red. Corolla tube as long as the calyx lobes thin pubescent lanceolate acute mucronate an inch long $\frac{1}{2}$ an inch wide. Lip very large and thin obovate involute nearly two inches long fringed with hairs. Stamen filament broad thin $\frac{3}{8}$ inch across, connective oblong much wider than the anther, crest ovate obtuse recurved red, back of stamen covered with white wool, anther $\frac{1}{2}$ an inch long oblong white. Style slender thickened upwards. Stigma transversely oblong, slit transverse.

Rocks and banks in wet woods.

Singapore, Bukit Timah. Johore, Gunong Panti. Selangor, Petaling, Gua Batu. Perak, Maxwell's Hill. Pahang, Tahan river. Sungei Ujong, Bukit Tampin; Perbentian Tinggi. A native also of Java.

C. Kingii Baker. Flor. Brit. Ind. l.c. 250.

Stem about six feet tall slender. Leaves oblanceolate oblong cuspidate, 8 inches long by 3 wide glabrous above, softly pubescent beneath, sheaths 2 inches long hispid ribbed, ligule hardly distinct with no long hairs on the edge. Spike from the rhizome on a long, stout peduncle over 2 inches long, conical cylindric,

three inches long by 2 through. Bracts ovate about $\frac{3}{4}$ inch long, upper ones smaller lancolate, mucronate, with a short point, covered with hair-like processes. Bracteole similar but smaller. Flowers solitary in the bracts, large and showy orange yellow. Calyx nearly one inch long tubular with three equal mucronate points hairy. Corolla tube 6 inches long wide, lobes oblong mucronate, pubescent. Lip convolute obovate 3 inches long and 2 inches wide. Stamen filament oblong rather short white woolly, tip rounded orange.

Penang, Pulau Butong (Curtis. 1976) Balik Pulau, fl. July. Perak, Larut Hills (King's Collector).

This is very near *C. globosus* Bl. but is distinguished by its pubescent leaves, narrower more hairy bracts. with less long and sharp points, and orange yellow flowers. The flowers are about three inches long. The lip is not so wide as that of *globosus* and is edged with hairs.

ZINGIBER.

This genus is very well marked by the curious prolonged point of the anther which occurs in no other genus here. The plants are all comparatively small, the stems being one or two feet tall, with the exception of one or two kinds which attain a height of six feet. The rhizome is usually thick and more or less aromatic. The spikes rise directly from the rhizome in all our species but abnormal forms occur in which they are borne on the ends of the leafy stems. I have seen this in the cultivated ginger *Z. officinale* L. and in a plant allied to if not identical with *Z. gracile*. The spikes are cylindrical or conical, with large broad red or yellow bracts, in each of which are one or more flowers. These are yellowish white, sometimes spotted with pink or mottled with black, one or two only open at a time and they last but a day. The calyx is tubular and short. The corolla tube projects but little beyond the bract, and the lobes are lanceolate or oblong. The lip is three lobed, the side lobes are turned up and I believe are really the staminodes which are joined to the true lip by their lower edges. The stamen is narrow and prolonged at the top into a long curved beak, which almost touches the lip over which it is curved. The style runs to the end of this beak. The fruit is a thin walled

capsule transparent and white and almost hidden in the bracts. When ripe it splits into its three segments and shows the black angled seed covered with a very thin white aril.

The Zingibers inhabit dense jungles, but two cultivated species can be found in waste ground near villages.

Z. Zerumbet Sm. Exot. Bot. ii. 105 t. 112. *Z. spurium* Koenig. Retz observ. iii. 60.

Rhizome fleshy yellow inside, white when old, bitter at first aromatic. Stems short and stout about 1—1½ foot high. Leaves crowded broadly lanceolate glabrous 4 to 6 inches long, 2½ to 3 inches wide, glabrous above with hairs on the midrib beneath ligule ½ an inch long papery brown. Spike globose to oblong 3 inches long, blunt on a stout peduncle covered with sheaths 3—4 inches long. Bracts broad rounded at first green eventually red, edges paler and hairy. Calyx spathaceous half an inch long, white. Corolla tube graceful twice as long, white, lobes lanceolate acute. Lip broad and short lateral lobes rounded, median orbicular to subovate retuse, pale yellow with an orange central bar, sometimes faintly mottled pink. Stamen short. Capsule oblong cartilaginous white splitting in 3 seeds oblong black ribbed covered by thin sweet aril.

Common in orchards and round villages, Singapore, Malacca, Selangor. The Lampoyang of the Malays used in native medicine,

Z. officinalis Rosc. The true ginger of commerce is cultivated here but never establishes itself as *Z. Zerumbet* does. It is known as Haliya. The leaves are narrow, the stems short. The spike which I have seen borne on the end of the leafy stem, is usually borne directly on the root stock. It is green with mottled black and yellow flowers, rarely however produced, and the fruit has never yet been seen. It is not known to occur wild anywhere.

Z. Kunstleri King. ms.

A herbaceous plant more like a shrub 4 to 6 feet high. Leaves lanceolate acuminate more than a foot long and three inches wide narrowed at base but not distinctly petioled, ligule very short. Flowering stem over a foot tall rather stout cov-

ered with sheathing leaves upper ones larger and uppermost with an ovate blade 2 inches long and one across. Spike short and broad (a capitulum) about three inches long and through. Bracts lanceolate apices deflexed. Flowers shortly protruding. Corolla tube slender, terete, lobes narrow lanceolate acute. Lip narrow shorter than the lobes, lanceolate acute, lateral lobes indistinct, hardly elevated. Anther longer than the lip, cells narrowly oblong, beak about as long as the cells narrow. Perak, open old jungle, rich rocky soil, 2000 to 2500 feet, August 1884. Flower-stem a rich light brown and pink. Flower pale white reddish and brown inside. (Kunstler, No. 2219).

I have never seen this plant, and take the description from a drawing and notes by Kunstler. It is a very striking and distinct plant in its round dense head of flowers and broad bract-like sheathing leaves just beneath it. The narrow lip distinctly shorter than the petals, and showing no large lateral lobes as in other species is also quite peculiar.

Z. spectabile Griff. Notulæ. iii. 413.

A very large noble species, with stout stems 7 feet tall, $\frac{1}{2}$ an inch through, glabrous slightly flattened. Leaves about 25, rather thin textured lanceolate mucronate subdistichous a foot long, 4 inches across dull green above, paler beneath, ligule thin rounded bilobed $\frac{1}{4}$ inch long. Scapes stout a foot long or more, covered with green sheaths, and bearing a showy spike a foot long. Bracts stiff ovate cartilaginous edges recurved, blunt, an inch long at first yellow then becoming scarlet. Flowers solitary in the bracts. Calyx spathaceous subobtuse shortly split $1\frac{1}{2}$ inch long striate white. Corolla tube $1\frac{1}{2}$ inch long, lobes lanceolate acute, upper one $1\frac{1}{2}$ inch long, $\frac{1}{2}$ inch across, lower ones narrower connate for half their length and adnate to the lip. All yellowish white. Lip 3 lobed broad a little shorter than the petals, lateral lobes broad rounded, median ovate bifid shortly at the apex, base and middle of lip thickened grooved, lemon yellow mottled with deep purple nearly black at the tip. Anther broad fleshy ocre yellow, appendage long curved acute purple. Stigma elliptic fringed all round with transparent processes. Capsule one inch long fleshy. Seed black with a white aril.

Malacca, Panchur. Negri Sembilan, Bukit Tampin. Selangor, Petaling, Caves, Kwala Lumpur. Pahang, Kwala Luit; Tahan (2407) Perak, Larut. King's collector (3205). Dindings at Lumut. Penang, Pulau Butong (Curtis 1978.)

The largest and grandest species known and well worthy of its specific name. The large showy spikes at first bright yellow then becoming brilliant red. with the strange black and yellow flowers make it a plant well worth cultivating.

Z. chrysostachys **n. sp.**

Stems graceful slender about 2 feet tall, $\frac{1}{8}$ inch thick purplish, leaves about ten rather distant lanceolate acuminate dark green, thin textured 5 inches long and $1\frac{1}{2}$ inch broad shortly petioled, ligule inch long oblong. Scapes about six inches tall with a peduncle 2 inches high, rather stout and covered with red sheaths. Spikes four inches long oblong, with broad truncate retuse bracts bright yellow. Flowers solitary. Corolla tube short white, lobes lanceolate acute one inch long white. Lip with a narrow linear base three lobed about as long as the petals lateral lobes ovate obtuse white, median lobe and disc between the lateral lobes white but mottled and marbled almost all over with crimson, apex shortly bifid. Stamen, filament linear, anther cells elliptic but little narrower than the connective. Beak curved acute thickly spotted with pink.

Perak on Maxwell's Hill about half way up (5199). (Curtis 2716.) (Wray 3549.)

Z. citrinum **n. sp.**

Stems stout one foot tall. Leaves dark green pubescent beneath broadly lanceolate subacute with the chief veins prominent, 8 inches long and four inches wide, petiole short or none, ligule very short rounded. Spike oblong blunt 4 or 5 inches long on a stout green peduncle 3 inches long. Bracts broad rounded bright lemon yellow, becoming dull pink in fruit. Calyx dilated transparent white subacute apex bifid $\frac{3}{4}$ inch long. Corolla tube graceful $2\frac{1}{8}$ inch long yellow. Dorsal petal lanceolate subacute apex incurved yellowish, laterals connate and adnate to the lip for two thirds of their length, $\frac{3}{4}$ inch long. Lip

shorter than corolla lateral lobes large oblong rounded, median lanceolate obtuse, yellow. Stamen long beak acute, anther cells grey, pollen flesh colour.

Selangor, Ginting Peras, Ginting Bidai, and Dusun Tua (7797). Perak, Ulu Bubong. (King 10263).

Z. graci'e Jack. Malay Miscell. i. No. 1. Bak. Fl. Brit. Ind. l.c. 246.

Stems slender 2 feet or more tall. Leaves ovate to ovate lanceolate acute six inches long $2\frac{1}{2}$ broad light green paler and pubescent beneath, ligule short. Spikes cylindric acute at the apex and tapering into the peduncle 4 to 6 inches long, peduncle 6 to 12 inches long. Bracts pink, ovate broad blunt or acute about an inch long. Flowers thin yellowish white. Calyx very thin semitransparent, lobes long lanceolate acute. Corolla tube an inch long, lobes lanceolate acute as long, upper one a little broader. Lip lateral lobes oblong rounded $\frac{1}{2}$ an inch long, mid lobe shorter than petals narrow deeply bifid lobes acute, narrow. Stamen filament short, anther elliptic beak long curved. Capsule $\frac{1}{2}$ inch long elliptic. Seeds 2 or three, ovoid black flat in front rounded behind $\frac{1}{4}$ inch long.

Singapore, Bukit Timah. Malacca, Sungei Hudang, Mt. Ophir. Pahang, Tembeling; Tahan. Selangor, Kwala Lumpur; Bukit Hitam. Penang.

Var. elatior.

A very much taller slenderer plant with stems about five feet tall, leaves narrow linear lanceolate acuminate 10 inches by 1, peduncle 18 inches and spike 7 or 8.

Hills at 2000 feet or upwards. Penang Hill. Perak, Maxwell's Hill.

King No. 7954. Possibly a distinct species.

Z. puberula. n. sp.

Stems 6 to 8 feet tall with numerous leaves, about $\frac{1}{2}$ an inch thick. Leaves oblong elliptic acuminate, a foot long $3\frac{1}{4}$ inch across, above deep green, glabrous, beneath paler covered especially on the stout midrib with brownish fur, petiole thickened $\frac{1}{4}$ inch long, broad, thickly covered with brown wool, ligule ovate bilobed, lobes blunt $\frac{3}{8}$ inch long and like the sheath covered with brown wool. Spikes numerous fusiform acute pink 3 to 6 inches

long with an equally long peduncle $\frac{3}{4}$ inch thick. Bracts ovate obtuse pubescent margined with brown fur. Inner bract lanceolate acute semitransparent white over $\frac{1}{2}$ an inch long, inch across. Calyx spathaceous one inch long shortly split apex truncate white. Corolla tube 2 inches long projecting beyond the bract $\frac{1}{8}$ inch through, white, lobes thin creamy yellow lanceolate acute an inch long, dorsal $\frac{1}{4}$ inch across, laterals narrower and connate for a quarter of their length and adnate to the lip. Lip shorter than the petals, three-lobed, lateral lobes oblong rounded, median longer oblong blunt all creamy white with yellower points (rarely bright canary yellow). Anther narrowly oblong $\frac{1}{2}$ an inch long brownish red, pollen creamy white, beak $\frac{1}{2}$ inch long yellow. Stigma transverse narrow, edged all round with rather long processes.

Singapore, common, Serangoon Road, (No. 4613) Bajau, Bukit Timah. Johor, Tanjong Kupang. Selangor, Ginting Bidai (No. 7798).

This is closely allied to *Z. gracile* and *Z. Griffithii* but is a very much bigger plant than either, and is very distinct in the pubescence of its leaves and bracts, and its long corolla tube. A plant cultivated in the Botanic gardens bore canary yellow flowers with the midlobe of the lip longer than usual and oblong. It also produced a spike on a peduncle 7 inches long covered with long pubescent sheaths at the base of the spike. The sheaths passed into narrowly oblong pubescent bracts, longitudinally striped red and green, and three of the upper ones bore ovate lanceolate blades half an inch long and $\frac{1}{4}$ inch wide.

Z. Griffithii Baker l.c. 246.

Stems about three feet tall, $\frac{1}{4}$ inch through slightly compressed striate. Leaves elliptic acuminate 8 inches long, 3 inches across glabrous deep green above paler pubescent beneath, sheaths split to the base pubescent, ligule $\frac{1}{8}$ inch long rounded deeply emarginate brown pubescent, petiole thick nearly $\frac{1}{4}$ inch long. Spikes fusiform 4 or 5 inches long on a stout peduncle 3 inches long, finely pubescent pink. Bracts broadly ovate one inch long and as broad. Flowers solitary yellowish white. Calyx very thin spathaceous $\frac{1}{2}$ an inch long. Corolla tube one inch long, lobes lanceolate acute $\frac{3}{4}$ inch long, lower ones connate

for about $\frac{1}{2}$ their length. Lip a little shorter, lateral lobes rounded, median lanceolate acute. Anther oblong brown, beak curved yellow. Stigma transverse fringed all round with hairs.

Singapore, Bukit Timah, etc. common. Johore, Bukit Tanah Abang; Batu Pahat (Kelsall). Malacca, Bukit Sadanen (1434 Goodenough). Perak, Tanjong Hantu; Bruas (Dindings No. 7224); Pahang, Taban River.

Var. major.

A very much larger plant than usual; leaves elliptic oblong acuminate $1\frac{1}{2}$ foot long, 5 inches across; sheaths glabrous, petiole almost wanting. Spike glabrous, thick with broad bracts, Flower 3 inches long. Corolla tube 2 inches.

Pahang, Kwala Tembeling. Perak, Bujong Malacca (No. 9820). A very large and stout plant, about five feet tall, with thick stems broad stiff leaves and much larger flowers. Perhaps a distinct species but the form of the flowers seems to me the same.

AMOMUM.

This genus has been used to include a large number of very different plants, but I would propose to retain it for those only which were included under the section *Eu-amomum* of Bentham. Thus restricted, the Amomums are plants with leafy stems from two to 6 feet tall, the inflorescence a short dense obconic spike rising on a short peduncle from the root stock. The bracts lanceolate or ovate, containing one or more flowers enclosed in thin bracteoles. Calyx tube as long as the corolla tube, the corolla lobes oblong or lanceolate. Staminodes absent. Lip large, often very large, and convolute. Stamen broad, with a rounded crest, and two horn-like or linear processes projecting from the upper angles. The style shorter than the crest. The fruit usually a succulent capsule, often covered with processes, and containing a large number of seeds.

This excludes from the genus as described in the Flora of British India, the genera *Hornstedtia* (*Achasma* and *Stenochasma*), *Phæomeria* and *Cenolophon*, and besides several other species such as *Amomum biflorum* Jack. (an Elleltariopsis) which appears to have got in by mistake.

A. Zanthophlebium Bak. l.c. 241. *A. stenoglossum* Bak. p. 234.

Stems six feet tall $\frac{1}{2}$ inch through. Leaves two feet or more in length, two to four inches wide oblong lanceolate with a long cusp, glabrous, petiole stout about an inch long ligule short truncate $\frac{1}{4}$ inch long pubescent. Spikes several on a plant, loose obconic six inches long or usually less on subterranean peduncles, stout 4 to 6 inches long covered with sheaths. Bracts oblong glabrous about 2 inches long and one inch across spreading, rather stiff cherry red. Bracteoles spathaceous keeled three lobed, lobes unequal dull pink. Flowers solitary. Calyx one inch long split to the base on one side 3-lobed, lobes unequal deeply cleft blunt pubescent, brownish pink. Corolla tube thick $1\frac{1}{2}$ inch long, lobes unequal, upper one broad ovate obtuse $\frac{1}{2}$ an inch wide, laterals narrowly oblong obtuse $\frac{1}{4}$ inch across, cherry red. Lip convolute entire little longer than the petals, obovate apex rounded yellow densely marked with red streaks, and spots. Stamen filament linear broad white with a red base anther $\frac{1}{2}$ an inch long linear yellow, cells parallel linear, pollen white, connective prolonged into a short rounded entire crest behind the stigma, and into two curved linear horns from the upper angles of the anther, yellowish tipped red. Style fusiform, stigma cup-shaped ocreous. Stylodia in the form of a short lobed disc almost surrounding the style. Capsule elliptic oblong finely pubescent, an inch long. Seeds numerous small black. Hab. dense damp jungles, flowering in May and June.

Singapore, Bukit Timah, Bukit Panjang, etc. Malacca (Maingay), Perak. Larut 500-1000 feet (King 1957), Bujong Malacca at 3000 feet elevation.

I have examined the plant on which *A. Stenoglossum* Bak. was based and find the stamen exactly the same as that of *A. Xanthophlebium*, and not crestless, as described.

A. flavum n. sp.

Stems tall and stout 12 to 15 feet pubescent. Leaves a foot long and 2 inches wide oblong lanceolate with a long point pubescent beneath, petiole very short, ligule truncate, as long. Spikes several borne on branches of the rhizome covered with ovate sheathing leaves $\frac{1}{2}$ to one inch long, peduncle $1\frac{1}{2}$ inch long. Spikes subglobose about an inch long and $2\frac{1}{2}$ inch across, com-

pact. Bracts ovate mucronate brown. Bracteole spathaceous pubescent bilobed, $\frac{1}{2}$ inch long, lobes mucronate. Calyx pubescent $1\frac{1}{2}$ inch long, tubular split down the back bilobed, lobes mucronate. Corolla tube as long, lobes ochreous upper one obovate hooded $1\frac{1}{2}$ inch long, laterals narrower oblong lanceolate Lip large, one inch across convolute obovate, margins recurved ribbed, yellow spotted with red in the centre. Stamen filament straight rather broad pale orange, anther narrow linear yellow. Crest reniform apices rounded with a short central projection, $\frac{1}{4}$ inch wide veined orange. Style shorter than the crest. Stigma cup-shaped.

Penang, Waterfall Gardens (Curtis 2275), Penara Bukit (7226). Sumatra, Lampongs, (H. O. Forbes).

Allied to *A. Xanthophlebium* Bak. but with smaller orange flowers brown ovate bracts and a very different crest.

A. lappaceum n. sp.

Rhizome stout. Stems tall and stout about 6 feet or even more. Leaves oblong lanceolate acuminate cuspidate somewhat narrowed at the base glabrous, not petioled, 18 inches long by four wide. Spikes numerous gradually elongating to 16 inches in length, cylindrical, rachis stout covered with brown tomentum. Flowers numerous shortly pedicelled ($\frac{1}{4}$ inch). Bracts oblong bifid at apex, points rounded, red, $1\frac{1}{2}$ inch long, 1 inch wide. Bracteole tubular $\frac{1}{2}$ inch long trifid, apices pink. Calyx tubular one inch long trifid apices acute equal, red. Corolla tube as long as the calyx, lobes linear upper one broader, oblong about half an inch long ochre yellow. Lip obovate rounded shortly bilobed. Staminodes none. Stamen rather short, anther $\frac{1}{2}$ an inch long, crest none. Ovary pubescent. Fruit oblong $\frac{3}{4}$ inch long covered with conic subulate spines, pedicels $\frac{1}{2}$ an inch long stout.

Dense woods, Selangor, Ginting Peras (7802). Perak (Scortechini 222) Wray; Maxwell's Hill, Ridley.

The most peculiar thing about this plant is the way in which the flower spikes gradually lengthen as the flowers open till they attain a length of 18 inches, and the pedicels which in the flower are about $\frac{1}{4}$ inch long become twice that length. The fruit is eaten by Sakais.

A. ochreum n. sp.

Stems tall and stout. Leaves oblong 3 feet long and 7 inches wide apex broad cuspidate glabrous, petiole hardly distinct very thick $\frac{1}{2}$ inch long ligule oblong obtuse. Spike short globose elongating in fruit, peduncle $1\frac{1}{2}$ inch long. Bracts lanceolate $1\frac{1}{2}$ inch long thin. Bracteole tubular $\frac{1}{2}$ inch long edge hairy. Flowers large yellow. Calyx as long as corolla, tube 1 inch long lobes lanceolate subobtuse 3-nerved tipped with hairs. Corolla tube thick lobes oblong obtuse $\frac{3}{4}$ inch long dorsal wide hooded. Lip very large over an inch long rounded convolute, yellow edge denticulate. Anther oblong $\frac{1}{2}$ an inch. Fruit large globose green succulent covered with short processes.

Selangor, Ginting Bidai.

A. perakense n. sp.

Rhizome stout woody with numerous stiff woody roots. Stems slender about $\frac{1}{4}$ inch through. Leaves narrow lanceolate acuminate with a long point base narrowed, petiole hardly distinct, 8 inches long one inch broad, ligule very small. Scapes several peduncles 2 inches long flexuous. Spike about as long rather narrow subcylindric. Bracts narrow oblong caducous $\frac{3}{4}$ inch long. Bracteole oblong obtuse flat. Calyx tube half an inch long dilated upwards three-lobed lobes lanceolate acute. Corolla tube slender barely longer than the calyx upper one largest $\frac{3}{8}$ inch long. Lip obovate longer than the corolla. Staminodes longer than the filament base linear apex setaceous. Stamen anther long narrow $\frac{1}{4}$ inch long, crest rounded distinct. filament short. Stigma obconic.

Perak. Maxwell's Hill. June 1893.

I have only collected this once and describe it from dry specimens. It is remarkable for its woody rhizome raised above ground, with stiff woody roots, like that of a *Geostachys* and its lengthening spike, of which the bracts fall off as it develops, leaving a bare rachis only bearing the short pedicels. In its large staminodes and small flowers it resembles *Z. macrodons* Scort.

A. testaceum n. sp.

Stems about 12 feet tall, clubbed at the base, stout. Leaves

lanceolate cuspidate gradually narrowed to the base over 2 feet long and 4 inches wide glabrous; ligule very short. Spikes several cylindric or fusiform 3 to 4 inches long on peduncles 6 inches long covered with green sheaths. Bracts papery striate and pale brown oblong subacute $1\frac{1}{2}$ inch long $\frac{1}{2}$ an inch wide silkily pubescent. Bracteoles tubular fawn-color, two lobed, silky $\frac{1}{2}$ an inch long. Calyx fawn-colored three-lobed, lobes rounded silky. Corolla tube barely longer, lobes linear oblong, white blunt $\frac{1}{2}$ inch long. Lip spoon-shaped entire, little longer than the petals white apex yellow, with a short carmine line at the base on each side, central bar thickened. Staminodes oblong truncate, buff. Stamen filament broad, broader than the anther, anther short thick and quadrate upper angles produced oblong obtuse, crest entire oblong blunt recurved. Style thickened upwards above the anther. Stigma very large oblong, much bigger than the crest, ovary silky.

Selangor, Caves Kwala Lumpur (8173) Pulau Tioman.

A dull colored plant with pale fawn colored bracts and inconspicuous white flowers. It flowers in December.

A. cylindraceum n. sp.

Stems six feet tall. Leaves oblong lanceolate acute narrowed at base, grey-green, 18 inches long by 2 wide glabrous closely veined, with a stout keel, petiole none, ligule very large $\frac{1}{2}$ inch long bifid lobes acute. Spikes cylindrical stout 6 inches long, on strong peduncles of equal length, covered with rufoustomentum and with large oblong sheaths an inch long. Bracts ovate oblong stiff brown. Bracteole $\frac{1}{2}$ inch long truncate bifid, tubular. Calyx tubular $\frac{3}{4}$ inch long truncate pubescent. Corolla tube an inch long slender pubescent, lobes oblong obtuse the upper one hooded, orange. Lip three-lobed, lobes rounded darker orange. Staminodes lanceolate acuminate. Anther crest oblong with two points at the side. Fruit globose rough, with numerous low ribs about $\frac{1}{2}$ inch long brown.

Dindings, Woods at Telok Sera.

Flowers in January, fruit in March. This is allied to *A. testaceum* in its cylindrical spike and small flowers.

A. uliginosum Koen. Retz. Obs. iii. 56. Baker. l. c. 247.

Rhizome with very long cylindrical branches about $\frac{1}{4}$ inch

through covered closely with brown sheaths. Stems about 5 feet tall or less. Leaves narrowly lanceolate narrowed to the base long-cuspidate one foot long, 1 inch wide, petiole very short or absent, ligule $\frac{1}{8}$ inch long rounded. Spikes usually distant from the stems on a branch of the rhizome, obconic, peduncled, peduncle 1 to 4 inches long covered with sheaths. Bracts elliptic ovate pink or brown. Calyx tubular pink $\frac{1}{2}$ an inch long, lobes narrow acute. Corolla tube a little longer, lobes linear acute narrow rosy. Lip boat-shaped narrowed at the base geniculate at the extreme base, with thickened deep maroon knees, white with a median yellow bar, a crimson line on each side of it and a few crimson spots at the base, $\frac{1}{2}$ an inch long. Stamen shorter than lip incurved, filament rather broad white, anther oblong, crest three-lobed, lobes squared, the centre one retuse. Stigma club-shaped. Fruit globose covered with soft red processes, $\frac{1}{2}$ an inch through.

Malacca, Bukit Sedanen (Derry 238). Sungei Ujong, Bukit Tampin. Pahang, Kwala Tembeling, Kota Glanggi, etc. (2404). Perak, Lumut. Dindings. Penang, Balik Pulau. Kedah. Yan.

This inhabits woods and banks, where its long branching rhizomes may be seen creeping for some distance.

It is said by Derry to be planted by the Jakuns for its eatable fruit and it is known to the Malays as Pua Hijau, Pua Gajah, and Tepus Merah. Its boat-shaped white lip with a yellow bar edged with pink and round red fruit covered with processes like those on a Rambutan make it easily recognized.

Koenig collected the type of *A. uliginosum* at Raput Nok in Junk Ceylon, and his description applies very well to this plant which I have found as far north as Kedah. He describes the crest however 4 lobed, perhaps counting the retuse central lobe as two lobes.

A. hastilabium. n. sp.

Rhizome aromatic rather slender woody. Stem 3 or 4 feet tall rather stout glabrous. Leaves oblong lanceolate acuminate at both ends glabrous, drying grey, 9 to 18 inches long and 2 to 4 across, petiole $\frac{1}{2}$ an inch long ligule ovate rounded $\frac{1}{4}$ inch. Spike short obconic compact 1 - 2 inches tall on a stout peduncle

an inch long. Bracts ovate lanceolate ribbed stiffly papery, light brown, mucronate, an inch long $\frac{1}{2}$ an inch wide. Bracteole lanceolate acute longer than the calyx. Flowers open two at a time. Calyx tube $\frac{3}{4}$ inch long cylindric truncate white narrowed at the base dilate above, deeply split in front. Corolla tube an inch long slender terete, lobes oblong blunt white $\frac{1}{2}$ inch long, ribbed. Lip broadly hastate, with a narrow linear base, lateral lobes rounded thin white, midlobe narrow oblong obtuse orange central bar dark orange with purple marks at the sides; one inch long and wide. Staminodes lanceolate acuminate apex setaceous white. Stamen filament broad linear white, anther oblong linear, cells dark red, crest broad oblong truncate pale orange longer than the style. Fruit globose about $\frac{1}{2}$ an inch long with strong ribs, hairy fawn-colored.

Singapore, Bukit Timah, Selitar. Johore, Gunong Panti, Selangor, Dusun Tua. Perak. Wray (3476).

Flowers in May. Perhaps as closely allied to *A. uliginosum* as to any of our species. The long corolla tube, and spade-shaped lip are unusual.

A. micranthum n. sp.

Rhizome creeping far slender with long woolly roots. Stems slender about 2 feet tall. Leaves narrow lanceolate acuminate, 6-7 inches long $\frac{1}{4}$ inch wide dark green glabrous, petiole very short or none, ligule very short truncate. Spikes short, obconic dense, one inch long on peduncles of the same length. Bracts narrow lanceolate acute pubescent $\frac{1}{4}$ inch long, brown. Flowers very small about half an inch long. Calyx a little shorter than the corolla tube, tubular with three short acute lobes, green. Corolla tube a little more than $\frac{1}{4}$ inch long lobes narrow linear, pale yellow. Lip oblong dilated towards the apex, then suddenly narrowed and bifid. centre depressed, with a round nectary at the base, pale yellow dotted with pink. Staminodes short linear. Stamen filament tapering upwards, and anther small oblong, with the upper angles produced into acute curved processes, and a small entire rounded crest. Style very slender. Fruit small globular purple brown covered with soft processes.

Penang Hill, in several places but not common. (Curtis 2884.) Negri Sembilan on Gunong Angsi.

Distinct in its narrow grassy leaves, and very small flowers.

A. macrodus Scott. Nuov. Giorn. Bot. Ital. xviii 309 from the Kinta Valley, Perak, has well developed staminodes, and a simple anther crest. It is perhaps a *Gastrochilus*. I have never met with it.

Hornstedtia.

This genus was founded by Retz (Observationes iii.) on the two common species of the peninsula *H. scyphus* and *H. Leonurus*. Later Blume described some species under the name of *Donacodes*. others he referred to the genus *Elettaria*. Griffith overlooking Retz' work, made two genera *Stenochasma* and *Achasma*, and finally they were all placed under *Amomum* by Bentham and Hooker, who was followed by Baker. I propose to restore Retz' genus and to include also under it the beautiful plants classed as *Phæomeria* Lindl. and *Nicolaia* Horan. The genus thus may be described. Plants with tall rarely short leafy stems, often 12 to 15 feet tall. Leaves numerous oblong petioled. Spikes radical on short or long peduncles, with large outer bracts usually red, ovate or oblong, forming a cup or spreading. Bracteoles thin tubular. Flowers sessile numerous. Calyx spathaceous thin. Corolla long or short-tubed, lobes oblong narrow not spreading. Lip narrow often long, linear or narrowly oblong, the sides at the base convolute over the stamen. Stamen short and thick, anther fleshy, bent at an angle with the filament, crest very small or none. Staminodes none. Capsule oblong with thin cartilaginous walls and numerous black seeds, or (section *Phæomeria*) sub-globose with a green fleshy pericarp and bony walls and brown angled seeds. Species about 20 known, scarce in India abundant in the Malay peninsula and the Western part of the Malay archipelago.

Section 1. *Eu-hornstedtia*. Spikes on very short peduncles buried in the ground. Tube of flowers very long, lip long. Fruit concealed in the persistent outer bracts, thin-walled oblong.

Section 2. *Phæomeria*. Spikes on tall peduncles, cone-shaped or cup-shaped. Tube of flowers and lip short. Fruit globose woody the outside green and fleshy, arranged in a ball, the bracts having disappeared.

To the former section besides those of the Malay peninsula belong *Alpinia linguiforme* Roxb. of India, and apparently from

the description, *Elettaria foetens* Bl. *E. minuta*, *E. coccinea* and *E. minor* Bl. *E. pininga*, *E. rubra*, *E. paludosa*, *E. tomentosa*, Miq. all of Java, but the descriptions published of these are inadequate. To the section 2 belong *H. imperialis*, *H. Maingayi*, *H. venusta*, *H. hemisphoerica* of the Peninsula, *H. involucrata* (*Amomum involucratum* Benth.) of Ceylon, *H. Fenzlii* (*A. Fenzlii* Kurz.) of the Nicobars. *H. pallida* (*Elettaria pallida Bl.*) *H. macrocephala*, (*E. macrocephala* Miq.)

H. scyphus Retz. Observ. vi. 18. *Amomum scyphiferum* Koenig. Retz. Observ. iii. 68. Bak. l.c. 237, *Stenochasma urceolare* Griff. Notul. iii. 431.

Rhizome stout and woody, stems ten feet tall $\frac{1}{2}$ an an inch through. Leaves oblong base oblique, 2 feet long and six inches wide dark green and glabrous above, paler beneath and hairy along the midrib or all over, petiole $\frac{1}{4}$ inch long, ligule oblong obtuse hairy, nearly half an inch long. Spike cylindric on a short stout peduncle, covered with oblong ovate bracts red, outer ones empty 2 inches long $1\frac{1}{2}$ broad longitudinally and transversely ribbed, thick and stiff in texture. Bracteoles lorate lanceolate 2 inches long $\frac{1}{4}$ inch wide, tips dark red with a scarious margin, minutely mucronate. Flowers solitary in the bracts opening one or two at a time, $3\frac{1}{2}$ inch long. Calyx spathaceous an inch long three-lobed flattened red, lobes rounded red tipped with white. Corolla tube much longer slender red, the lobes lanceolate oblong, upper one hooded $\frac{3}{4}$ inch long $\frac{1}{4}$ wide, lower ones shorter adnate to the lip below for the greater part of their length, all deep shining red. Lip a little longer than the upper petal, side lobes rounded embracing the stamen, apex fleshy tongue-shaped dark red pubescent especially in the centre. Stamen filament short broad, anther cells linear grey, upper part only polliniferous lower part pubescent crest ovate rounded. Staminodes absent. Style slender white. Stigma red cup-shaped, terminal pubescent. Stylodes forming a tube round the base of the style with their tips free, half an inch long, ovary glabrous 3-celled, ovules numerous. Capsule oblong obscurely triangular $\frac{3}{4}$ inch long, $\frac{1}{4}$ inch through yellowish white, thinly cartilaginous. Seeds numerous black smooth truncate angled $\frac{1}{16}$ inch long enclosed in an acid pulp.

Common in woods. Singapore very common. Johor, Tanjong Bunga. Selangor, Bukit Hitam; Petaling. Malacca. Also in Pulau Buru, South of Singapore. Mandan River, Siak, Sumatra and Penghulu Ampat. Sarawak (Haviland).

H. Ophiuchus. *Amomum ophiuchus* Ridl. Trans. Linn. Soc. l.c. p. 381.

Stems about 12 feet tall clubbed at the base. Leaves oblong lanceolate glabrous 1½ feet long 3 inches wide, petiole ½ an inch long, ligule ovate oblong obtuse pubescent. Spike fusiform 5 inches long. Bracts ovate or ovate lanceolate acute mucronate ribbed silky pubescent 2 inches long and one wide red. Flowers 5 inches long red. Calyx tubular 3 inches long acute silky below glabrous above. Corolla tube graceful, lobes lorate cucullate shining red. Lip as long lorate apex hooded fleshy red with white edges pubescent inside. Stamen anther oblong emarginate with no crest pubescent red. Style slender. Stigma pubescent clubbed, ovary silky.

Pahang, Tahan woods.

Allied to *H. Scyphus* but the bracts are narrower and more acute and have not the cross bars of that species.

H. grandis n. sp.

Rhizome stout elevated above the ground. Stems tall and stout swollen at the base. Leaves oblong cuspidate nearly 3 feet long and 6 inches across glabrous petiole ½ an inch pubescent ligule longer pubescent sheaths pubescent. Spikes elongate obconic cylindric 8 inches tall covered with ovate rounded bracts hispid on the edges and covered with transverse irregular elevations, the longitudinal ribs being rather obscure. Bracteoles narrow lanceolate. Calyx cylindric tubular 3 feet 2 inches long. Corolla tube nearly 5 inches long terete but dilated at the apex, upper lobe lanceolate obtuse one inch long, lower ones oblong lanceolate. Lip but little longer, lateral lobes little developed, apex rounded entire pubescent. Stamen filament ¼ inch beyond the mouth of the corolla tube, anther ½ inch long, hairy, crest ovate acute. Style stout pubescent. Stigma cup-shaped pubescent, ovary glabrous. Stylodes an inch long narrow.

Perak, Maxwell's Hill. June 1893.

Nearly allied to *H. Scyphus* but much bigger in all its parts.

H. conica n. sp.

Stems stout about five feet tall. Leaves oblong lanceolate cuspidate 2 feet long 3 - 4 inches wide glabrous above pubescent or glabrous beneath, drying red, petiole $\frac{1}{2}$ to 1 inch long, glabrous or hispid, ligule large $\frac{1}{2}$ an inch long, ribbed longitudinally and with small transverse bars. Spike four inches long, fusiform acuminate. Bracts ovate acute upper ones narrower and longer, pink covered with a fine silvery tomentum, longitudinally ribbed. Bracteoles thin narrow glabrous. Flowers purplish pink shortly protruded. Calyx tubular ending in a long point 2 inches in length, silky at the base. Corolla tube very slender twice as long, dilated a little above, lobes oblong obtuse $\frac{1}{2}$ inch long, purple pink. Lip longer, tongue-shaped blunt.

Singapore, Bukit Panjang. Johor, Gunong Panti. Selangor, Bukit Hitam; Langat.

The flower spike in this species dilates from a narrow base and then tapers to a point from which the flowers protrude but a short way, little more than an inch. The very long slender corolla tube and short entire lip are also peculiar points, it is allied to *H. ophiuchus*.

H. Leonurus. Retz. Observ. vi. 18. *Amomum Leonurus* Koen. Retz. observ. iii. 69. *Stenochama convolutum* Griff. Not. iii 433. *Amomum Ridleyi* Bak. Kew Bulletin 1892. 127.

Stems about 12 feet tall bearing about 20 leaves, Leaves oblong acuminate base truncate glabrous, polished dark green above a foot and a half long, and $4\frac{1}{2}$ inches across petiole one inch long, ligule entire rounded blunt $\frac{3}{8}$ inch long. Spike cylindric 3 inches long almost buried. Bracts lanceolate acute minutely silvery pubescent $2\frac{1}{2}$ inch long and $\frac{3}{4}$ inch wide. Flowers in pairs. Calyx tubular spathaceous split almost the whole way down on one side, apex entire 3 inches long. Corolla tube slender gradually enlarged upwards 3 inches long lobes linear oblong hooded, the upper one $\frac{1}{4}$ inch across, the others not connate much narrower, red, one inch long. Lip hastate blunt, sides upcurved, apex longer fleshy, red, as long as the corolla. Stamen filament broad and flat, edges thickened centre depressed, deep red $1\frac{1}{2}$ inch long anther oblong blunt $\frac{1}{2}$ inch long, pubescent. Style very slender filiform red, stigma

clubbed. Stylodes linear narrow.

Woods. Singapore, common. Johor, Gunong Panti. Malacca, Rim. (Griffith.) Pahang, Pulau Tawar.

Griffith's account of this curious plant is very accurate. The leaves are waved, and dark polished green. The flower spike imbedded in the ground silky pubescence on the bracts protecting the buds from injury by wet. The flowers are very inconspicuous in the dark damp jungle, but the pale colored tips of the corolla lobes is conspicuous enough to attract attention to them. The pollen when shed is protected by the pubescence on the anther from the effects of the surrounding wet in a very curious manner. The plant is known as Pua Hitam by the Malays.

H. affinis n. sp.

Leaves, lanceolate acuminate 8 inches long by 2 wide, minutely pubescent and fringed with rufous hair, petiole $\frac{1}{4}$ inch long ligule longer covered with rufous hair. Spike cylindric 3 inches long, bracts oblong ribbed. Flowers four inches long. Calyx tubular bifid as long as the corolla tube 2 inches lobes short acute, base hispid. Corolla-tube dilated at the top, lobes linear oblong upper one hooded and enclosing the other two which are thinner and smaller. Lip shorter little more than half an inch long, hastate, the two side lobes large and rounded apex narrow blunt. Stamen nearly as long as the dorsal corolla lobe, filament broad and thin, anther as long as the filament, apex notched, no distinct crest, cells pubescent. Style slender, stigma small, ovary hispid.

Borneo, Sarawak, Kuching. (Haviland 1764).

Near *H. Leonurus* but differing in the pubescence. The leaves in the specimen are only the terminal ones, the lower ones are probably much larger. A closely allied plant, if not absolutely identical, was obtained by Mr. Fox on the Rumpin river in Pahang. It has a stout woody rhizome with several spikes, which however are too young to show the flowers.

H. pusilla n. sp.

Rhizome slender woody sinuous. Stems 8 inches tall very slender. Leaves few 3 or 4 elliptic lanceolate with a long point

6 inches long 1½ wide, the point, one inch, base broad, no petiole glabrous, ligule very small sheaths somewhat hispid. Spike small few-flowered on a peduncle half an inch long. Bracts ovate mucronate ribbed half an inch long glabrous red. Bracteole cylindric ribbed pubescent. Calyx short. Corolla tube short about ½ an inch lobes linear red. Lip narrow entire fleshy. Stamen filament short anther ⅜ inch long hardly retuse at the apex. Style filiform stigma cup-shaped pubescent. Stylodes ⅛ inch rather thick.

Pahang. Kwala Tembeling.

The smallest species I have seen, easily distinguished by the few-flowered spike, the flowers somewha resembling those of *H. Leonurus* but much smaller.

H. pauciflora. n. sp.

Stems rather slender terete distant 1½ feet long. Leaves oblong cuspidate glabrous 1½ foot long 4 inches wide, petiole ½ an inch long, ligule lanceolate 1 inch. Spikes deeply sunk in the ground 2 to 4 flowered. Bracts narrow lanceolate acute fleshy, white, 2 inches long. Bracteole 2 inches long tubular bilobed, lobes acute white. Calyx narrow at the base dilate upwards trilobed, lobes acute, 3 inches long red. Corolla tube as long, upper lobe lanceolate subacute cherry red, lower ones shorter oblong obtuse deep red. Lip narrowly lanceolate obtuse apex barely enlarged, lateral lobes rounded, flame color, with the central bar thickened yellow. Stamen filament short, anther bent oblong emarginate deep red, pollen cells white. Style filiform, stigma cordate recurved white. Staminodes oblong truncate grooved, buff.

Selangor. Abundant at the Caves, Gua Batu. 1893.

This plant is remarkable for the inflorescence being reduced to but 2 or 3 flowers, with thin cartilaginous white bracts sunk in the ground so that only the upper part of the flowers appear.

H. triorgyale n. sp. *Amomum triorgyale* Bak. l. c. 237.

Stems 18 feet tall stout pubescent. Leaves oblong acute 2½ feet long 7 inches across glabrous above softly pubescent beneath, petiole ½ inch, ligule large. Spike short and broad ovate 4 inches long and 2 inches through. Bracts broad ovate 2 inches long and wide longitudinally ribbed pubescent deep rose

colour, inner ones lanceolate $2\frac{1}{2}$ inches long rosy at the tips. Bracteoles bifid tubular 2 inches long. Calyx tubular bifid mucronate, lobes narrow, one subdivided 3 inches long, cherry red. Corolla tube as long, lobes linear oblong blunt, upper one the largest $1\frac{1}{8}$ inch long, cherry red, lower ones one inch long $\frac{1}{8}$ inch wide rosy. Lip broad oblong entire blunt one inch longer than the corolla cherry red. Stamen anther rather broad and thick notched, crest none. Stylodes unusually long $\frac{1}{4}$ inch lanceolate entire white.

Selangor, Ginting Peras (7806). Perak, Thaiping Hills (Dr. King 2105).

One of the finest and perhaps the biggest in the section. The rose colored inflorescence with the cherry colored lip are very beautiful.

H. albomarginata n. sp *Amomum sphaerocephalum* Bak. l.c. 234.

Stems about four feet tall slender red glabrous. Leaves when young light green barred with red, when full grown dark polished green (drying red beneath) glabrous or finely pubescent beneath no petiole ligule short and broad. Spikes 2 inches long subcylindric few flowered. Bracts lanceolate mucronate red 2 inches long $\frac{1}{2}$ an inch wide pubescent ribbed. Bracteoles in pairs thinner red edged with yellow hairs. Calyx tubular trifid $1\frac{1}{2}$ inch long lobes tipped with yellow hairs. Corolla tube about as long lobes tipped with white hairs, lower ones shorter than the upper one, lying curved up over the lip. Lip 2 inches long sides curved up over the stamen edged white. apex narrow linear obtuse deep red. Stamen filament short deep red, anther oblong entire deep red, keeled on the back half an inch long pollen yellow. Style slender, stigma heart-shaped with a narrow linear groove.

Penang Hill abundant. Dec. 1895 (7233), Dindings, Lumut. Selangor, Petaling. Perak, Gunong Keledang.

I suppose this plant to be the *A. sphaerocephalum* Bak., but the spike is by no means spherical and the lip is usually at least entire, but in a plant flowered in the gardens I find some flowers with the apex of the lip three-lobed, while others are entire.

H. velutina n. sp.

Stems tall and stout. Leaves oblong lanceolate 15 inches long 4 inches wide glabrous above, velvety with long hairs beneath, base tapering into a petiole half an inch long, ligule as long, oblong obtuse velvety. Spike at first globose $1\frac{1}{2}$ inch long elongating with growth, peduncle 2 inches long. Bracts oblong obtuse about an inch long velvety dark red. Bracteole oblong truncate pubescent dull red $1\frac{1}{2}$ inch long. Calyx tubular pubescent trifid shorter. Corolla tube shorter than calyx, lobes short oblong rounded at the tip upper one a little longer. Lip oblong rounded bilobed, edges not meeting over the anther cherry red, the edges at the base whitish. Anther oblong retuse. Stigma deep red.

Borneo, Bongaya River.

H. megalochilus. Achasma megalocheilos Griff. Notul. III. 426, Pl. CCCLV. *Amomum megalochilus* Bak. Flor. Brit. Ind. p. 236, *A. rubroluteum* Baker, l.c.

Stems stout and tall 12 to 15 feet, and $1\frac{1}{2}$ inch through clubbed at the base. Leaves broadly oblong cuspidate base oblique rounded glabrous dark green, 2 to 3 feet long, $3\frac{1}{2}$ to $4\frac{1}{2}$ inches wide, petiole half to one inch long, ligule oblong rounded $\frac{1}{2}$ inch long. Spikes 2 to 3 inches long on long subterranean branches of the rhizome deeply sunk in the earth peduncles $1\frac{1}{2}$ to 1 inch long covered with ovate bracts. Bracts ovate acute mucronate strongly ribbed when dry, margins ciliate bright red, about an inch long. Bracteoles narrow linear lanceolate pubescent. Calyx 3 inches long trifid lobes acuminate. Corolla tube 2 inches long rather slender, pubescent within, lobes linear acute an inch long, shorter than tube of the lip red. Lip 2 inches longer than the corolla the sides rolled up at the base, spathulate, apex dilated entire or retuse, crimson edges yellow. Stamen filament short broad, anther short oblong about $\frac{1}{2}$ an inch long emarginate with no real crest deep red. Style slender longer than anther, stigma triangular. Stylodes oblong acute. Ovary pubescent.

Common in wet woods, often forming dense thickets.

Singapore (rare) Bukit Mandai. Pahang, Tahan Woods; Pekan. Malacca, Bukit Sadanen. Negri Sembilan, Bukit Tampin.

Selangor, Kwala Lumpur ; Langat. Perak, Dindings, Lumut : Thaiping hills. Penang, Government Hill (Curtis 2419).

The brilliant crimson and yellow flowers appearing often dotted all over the ground are most attractive. In Griffith's description he has evidently intended to write of them " vivide coccineus," which has been printed viridia coccineus, and translated into "greenish red." *Amomum rubroluteum* Bak. collected by Maingay in Penang is this plant I should judge from its description. The back of the stamen is prolonged a little beyond the anther as Griffith shows in his figure and this seems from the description to be the only distinguishing character of *A. rubroluteum.*

H. metriochilus n. sp. *Achasma metriocheilus* Griff. Notul. iii. 427. Ic. Pl. As. t. 356. *Amomum metriochilus* Bak. lc. 234.

Stems tall and stout about 12 feet tall. Leaves oblong mucronate, glabrous above, softly velvety pubescent or glabrous beneath over 3 feet long and six inches wide, petiole stout 2 inches long or less, ligule oblong truncate one inch long. Spike about 2 inches long on a stout peduncle. Bracts ovate mucronate ribbed glabrous about an inch long red. Corolla tube 2 inches long pubescent within, lobes broad lanceolate crimson one inch long, longer than the stamen. Lip 2 inches longer than the corolla, linear emarginate, the sides rolled up over the stamen at the base, crimson with a yellow centre. Stamen filament very short, shorter than the anther, anther short and broad, almost square emarginate bent at an angle on the filament, deep rose colour. Style slender, stigma triangular.

Johor, Gunong Panti ; Gunong Pulai. Perak, Maxwell's Hill. Selangor, Caves.

H. macrochilus n.sp. *Amomum macrochilus* Bak. l.c. 235. *Achasma macrochilus* Griff. Notulæ. iii. 429. Ic. Pl. t. 357.

Stem stout 12 feet tall. Leaves elliptic oblong cuspidate base rounded unequal, glabrous 15 inches long 4 inches wide, petiole half an inch long or less, ligule shorter ovate obtuse. Spike subcylindric with rather thin lanceolate acute bracts, glabrous ribbed 2 inches long. Bracteoles narrow linear glabrous. Calyx tubular dilated upwards trifid, lobes acute $1\frac{1}{2}$ inch long.

Corolla tube longer 2 inches in length lobes short broad blunt. Lip $1\frac{1}{4}$ inch long, narrow linear apex deeply bifid, lobes narrow $\frac{1}{4}$ inch long. Anther $\frac{1}{4}$ inch long deeply emarginate.

Malacca at Ayer Panas (Griffith). Perak, Thaiping Hills (Curtis) (King 1897).

Apparently rare as I have not met with it. It is easily distinguished by its narrow lip deeply forked at the end. The flowers are entirely red according to Griffith.

Baker's *Amomum gomphocheilus* (Flor. Brit. Ind. vol p. 226) is based upon the plant numbered 1897 of King's collection but he says the tip of the lip is cuneate, while the plant I have received from Calcutta under this number is as described above and is clearly Griffith's *Achasma macrocheilus*.

§ 2. PHÆOMERIA Lindl.

H. imperialis Ridl. *Phæomeria imperialis* Lindl. Introd. Nat Syst. ed. 2,446. *Alpinia magnifica* Roscoe. Scitam. 75.

Stems about 13 feet tall one inch through. Leaves oblong acute green glabrous 2 feet long and 6 inches across, ligule ovate blunt nearly an inch long. Scapes about 3 feet tall partly covered with green sheaths, head cone-shaped elongating as the flowers open to 4 inches. Bracts lower ones oblong ovate 4 inches long and 2 inches across, spreading or recurved fleshy empty, upper ones linear oblong, all waxy pink with white edges. Bracteoles tubular spathaceous 3-lobed, short. Calyx $\frac{1}{2}$ inch long deeply bifid lobes acute red. Corolla tube barely an inch long, lobes lorate thin obtuse pink. Lip longer narrow oblong obtuse, sides convolute, crimson with a white edge. Stamen filament linear flat white pubescent, anther oblong emarginate crimson splitting at the top. Style rather stout, stigma clubbed with a slit on the lower face. Stylodes short broad and thick, lobed. Fruits obconic green hairy, one inch through in a compact head, seeds numerous black enclosed in a translucent acid pulp.

Commonly cultivated under the name of Kantan, the spikes in bud being eaten as a curry stuff. This form may possibly not be native.

Johore, Kota Tinggi. Perak near the Waterfall, Thaiping.

Var. *speciosa*. *Elettaria speciosa*, Bl. Enum. I. p. 51. *A. elatior* Hook. Journ. Bot. I. p 359.
Margins of lip yellow.
Native of the Peninsula, Java and Sumatra. Selangor, Rawang. Perak, Tambun near Ipoh, Larut (King's Collector 3075).

Elettaria anthodioides Teysm. is probably the same plant but appears to be rather smaller.

H. fulgens n. sp.

Rhizome stout and woody an inch through. Leafy stems about 15 feet tall and one inch through swollen at the base. Leaves oblong with a broad unequal base 2 feet long and 6 inches wide glabrous except the edge which is pubescent, dark green above tinted purple beneath when young, petiole an inch long, ligule covered with brown wool. Scape four feet tall, stout $\frac{3}{4}$ inch through, covered with dark green sheaths rounded at the tip and mucronate below the tip, head about 3 inches tall 4 inches across. Bracts stiff coriaceous, lower ones broadly ovate with a stiff mucro 3 inches wide and long dull red outside, polished blood red within edges greenish white. Inner bracts (floral ones) linear oblong obtuse dull red edged whitish mucronate. Flowers about as long as bracts. Calyx spathaceous with three short acute points and three red ridges corresponding $1\frac{1}{4}$ inch. Corolla lobes linear obtuse pink longer than calyx $1\frac{1}{2}$ inch. Lip ovate obtuse deep red margin yellow $\frac{1}{2}$ inch long, beyond the tube. Stamen shorter, anther red deeply notched $\frac{1}{4}$ inch long. Stigma large style pubescent. Stylodes broad at the base lobulated above.

Perak, Larut hills.

This species differs from *H. imperialis* in its stouter and shorter scape broader and shorter head with stiff red ovate bracts, nearly entire calyx very shortly split, longer and broader corolla lobes, and larger stamen. In many respects it is intermediate between *H. imperialis* and *H. hemispherica* (*Amomum hemisphæricum* Hook fil.).

H. venusta n. sp.

Stems ten feet tall $1\frac{1}{2}$ inch through clubbed at the base,

above terete and smooth. Leaves oblong green over 2 feet long and 6 inches wide narrowed towards the base, ligule short rounded edge pubescent. Scapes 2 feet tall, ped-peduncle $\frac{1}{2}$ an inch through partly covered with mucronate pink sheaths the rest arachnoid. Head broad cup-shaped, base much broader than the peduncle, 3 inches long by 5 wide, outer bracts very broad oblong the tips recurved, appressed to the flowers 3 inches long $2\frac{1}{4}$ wide rosy, somewhat fleshy, receptacle conic. Flower bracts linear oblong shorter than the flowers 2 inches long, $\frac{1}{4}$ inch wide. Bracteole shorter spathaceous $1\frac{1}{4}$ inch long split along the back whitish. Calyx $1\frac{1}{2}$ inch long trifid split on one side deep red. Corolla lobes linear spathulate $1\frac{1}{4}$ inch long obtuse red pink. Lip half an inch long thin oblong apex rounded blunt white the centre spotted pink. Stamen filament with white hairs, anther oblong inch long white cells covered with yellow hairs, emarginate. Style broad linear flattened above terete below. Stigma oblong flattened red. Fruit large conical beaked, glabrous red 3 inches long $1\frac{1}{2}$ through at the base, ovules very numerous.

Selangor, Woods at Ginting Bidai.

One of the noblest species with the inflorescence in the form of a large broad-bottomed cup rose coloured and wax-like. The points of the erect outer bracts are turned downwards. The flowers are also rosy, and the fruit in a large round head waxy red with long projecting beaks.

H. Maingayi mihi. *Amomum Maingayi* Baker l.c. 235.

Rhizome long creeping throwing up leafy stems at some distance apart, shoots red roots strong and wiry. Stems about nine feet tall $\frac{3}{4}$ inch through olivaceous green. Leaves oblong acute 18 to 24 inches long, 5 inches wide glabrous above, pubescent beneath, keel large rounded, petiole about $\frac{1}{2}$ inch long apex rounded sheaths striate glabrous. Peduncle graceful but stiff, a foot tall, with pink sheaths with oval apices, head sub-globose $1\frac{1}{2}$ inch long, outer. Bracts broad, with rounded edges, retuse mucronate appressed, pink entirely covered with silvery pubescence except the glabrous crimson margins. Inner bracts lanceolate over one inch long. Bracteole spathaceous tubular one inch long pubescent split on one side with three lanceolate muc-

ronate points. Flowers 2 inches long rose-colored. Calyx tubular with three lanceolate points longer than the corolla. Corolla lobes blunt oblong. Lip 3-lobed, laterals erect oblong, median lobe longer oblong dark rose colour. Stamen filament linear broad, anther bent at an obtuse angle more than $\frac{1}{4}$ inch long deeply excavate dark crimson, pollen white. Style very slender, stigma reniform slit linear, not central, dark madder colour. Fruit obconic nearly glabrous half an inch long.

Singapore, Bukit Timah, Sungei Buluh. Pahang, Kota Glanggi. Selanger, Dusun Tua. Perak (Wray No. 3).

From the very short inadequate description, *Nicolaia pallida* Horan. from Java may be the same species. This plant is really intermediate between the two sections.

PLAGIOSTACHYS n. gen.

Stems usually very tall and stout with lanceolate leaves, pubescent. Flower spike thick borne on a peduncle covered with sheathing leaves and projecting from the side of the leafy stalk. Bracts oblong ovate laciniate. Flowers numerous small and fleshy. Calyx spathaceous short. Corolla tube short and thick, lobes oblong or ovate fleshy. Lip flat oblong. Stamen with a short thick filament an oblong anther, emarginate but with no crest. Staminodes two short subulate processes. Style rather short. Capsule ovoid conic or oblong, three-celled seed 3 or 4 in each cell, angled.

Malay peninsula and Borneo.

The type species of this curious genus I referred originally to *Amomum*, being unwilling to make a new genus of it, as loug as the genus *Amomum* was understood as containing a heterogeneous mixture, but I am by no means certain now that the genus has not really more affinity with *Alpinia*. The peculiar position of the inflorescence is normally unique in the order. The fleshy simple flowers with a crestless anther are certainly more like those of some *Alpinia* than anything else, and Mr. Baker has referred *P. strobilifera* to that genus.

P. strobilifera n. sp. *Alpinia strobilifera* Bak. Kew Bulletin 1898. 235.

Stems about 2 feet tall fairly stout pubescent. Leaves lanceolate pubescent six inches long and three wide, sheath

tomentose, ligule very short pubescent. Spike lateral 3 inches long, rachis tomentose. Flowers numerous $\frac{1}{2}$ an inch long, crowded, buds red, shortly stalked. Bracts brownish $\frac{1}{4}$ inch long ovate hairy outside. Calyx cartilaginous tubular 3-lobed red. Corolla tube barely as long, thick, lobes oblong, upper one hooded, lower ones shorter red. Lip oblong bilobed apex orange base reddish orange. Anther large oblong retuse pubescent red.

British North Borneo, Bongaya River 1897; Sandakan (Creagh).

Pl. lateralis n.sp. *Amomum laterale* Rid. Trans. Linn. Soc. III. p 381.

A stout plant usually about six feet tall, with a thick underground rhizome. Leaves lanceolate acuminate pubescent $2\frac{1}{2}$ feet long, 4 inches wide, dark green, petiole one inch long, ligule obtuse bilobed $\frac{1}{4}$ inch long. Spike about six inches long protruded a foot or more above the ground from the side of the stem, sometimes branched, thick cylindrical, on a peduncle covered with ovate sheaths. Bracts oblong with laciniate edges. Calyx conic tubular as long as the corolla white. Corolla tube thick $\frac{1}{4}$ inch long, lobes ovate acute dark red fleshy. Lip short obtuse flat emarginate, fleshy orange yellow, papillose. Stamen filament short thick pubescent, anther oblong pubescent white. Staminodes two short acute teeth. Stylodes flesh colour oblong truncate, with a short blunt tooth. Capsule $\frac{1}{2}$ an inch long, ovoid conic thin-walled, pale brown. Seeds 3 - 4 in each cell.

Singapore, Bukit Timah, Bukit Mandai, Reservoir Woods. Negri Sembilan, Perhentian Tinggi.

Another species I found in fruit on Gunong Panti in Johore was as large as the last species but had spikes six inches long and oblong fruit $\frac{1}{2}$ an inch in length containing about 12 black angled seed very aromatic.

ELETTARIOPSIS.

This genus is most closely allied to Elettaria, and like it is almost peculiar in having the flower spikes borne on long creeping branches generally imbedded in mud, and rooting at intervals. The rhizome is slender and only slightly aromatic. The

leaves either solitary, *E. exserta*, *E. Curtisii*, or tufted, *E. serpentina*, or borne on an erect stem a foot or more tall. The flower spikes scattered along the creeping branches of the rhizome, are very short, only an inch or two long, and bear esveral flowers in the axils of dry short bracts. The calyx tube is usually long with three lobes, and the corolla tube long and graceful with narrow lobes. The lip is fairly large entire and rounded, usually white with a central yellow bar with red marks along it. The filament of the stamen is broad and short, the crest of the anther large and rounded, sometimes toothed. The style is slender, increasing above the anther, the stigma conical and rather large. The fruit, which is rarely to be met with, is in *E. longituba* a large round white capsule.

These plants are to be met with in damp woods often in great abundance, but seldom seen in flower.

SPECIES.

Leaf solitary.	Leaves few in a tuft.	Leaves on an erect stem.
1. *E. exserta* Bak.	3. *E. serpentina* Bak.	4. *E. latiflora* Ridl.
2. *E. Curtisii* Bak.		5. *E. pubescens* Ridl.
		6. *E. multiflora* Ridl.
		7. *E. longituba* Ridl.

E. exserta Baker l.c. 251. *Cyphostigma exserta* Scortechin. Nuov. Giorn. Bot. Ital. viii. 310 t. 13.

Rhizome slender, leaf usually solitary elliptic acute tapering into the petiole four to six feet tall including the petiole, the blade three feet long and one across. The scape erect with several scattered sheaths half an inch in length, bearing a single flower. Calyx tube slender three-lobed one inch long, corolla tube slender three inches long with lanceolate lobes ¾ inch in length Lip oblong entire yellow with two red lines in the centre. Stamen with a short rounded crest, style longer than the crest, stigma cup-shaped.

Perak, Kinta (Scortechini).

The single gigantic leaf, and the erect scape with a single flower, distinguish this from all other species. I have never seen it.

E. Curtisii Bak. l.c. 252.

Rhizome far creeping, with woolly roots. Leaf solitary, blade a foot long and three inches wide lanceolate acuminate glabrous tapering below into the petiole, which is eight inches long and included in a long ribbed sheath. Flowering stems short three inches long. Bracts oblong lanceolate about half an inch long. Spikes scattered one or two flowered. Calyx spathaceous ampliate unequally three-lobed an inch long. Corolla tube 2 inches long, slender enlarged upwards, lobes oblong blunt white $\frac{1}{2}$ an inch long and $\frac{1}{4}$ wide. Lip obovate oblong median bar thickened $\frac{3}{4}$ inch long. Stamen filament short rather broad, anther thick crest oval entire large. Style shorter than the crest, stigma cup-shaped large.

Penang Hill. Bukit Laksamana (Curtis 1705).

E. serpentina Bak. l.c. 252.

Rhizome as in *E. Curtisii*. Leaves three in a tuft unequal lanceolate acuminate narrowed into the petiole, glabrous, blade six to 8 inches long, two inches wide, petiole 4 inches long, glabrous. Flowering stems short two inches long covered with rather short oblong dry sheaths. Calyx tube one inch long, lobes linear $\frac{1}{4}$ inch long. Corolla tube as long as the calyx rather thick, lobes oblong $\frac{1}{2}$ an inch long, white. Lip oblong obovate cuneate apex rounded longer than the petals $\frac{3}{4}$ inch long. Stamen filament broad and short, crest of anther very large oblong rounded. Style rather thick shorter than the crest, stigma large obconic with a very large slit.

Penang, 1000 to 1500 feet alt. May (King's Collector) Fls. white red brown and yellow in centre.

E. latiflora n. sp.

Rhizome far creeping $\frac{1}{4}$ inch through almost covered with sheaths faintly aromatic, roots stout woolly. Leafy stems six inches to a foot tall with about five leaves blade lanceolate ovate lanceolate cuspidate dark green glabrous above pubescent beneath 10 to 13 inches long 2 to 4 inches wide, petiole rather slender 2 to 4 inches long base of the stem covered with long sheaths. Floral stems often numerous three or four inches to about six or even longer, spikes rather distant 2 flowered.

Bracts closely wrapping the flower pinkish ½ an inch long. Calyx 1½ inch long terete, the apex entire lanceolate split on one side red. Corolla tube three inches long slender white lobes oblong obtuse apices incurved ¾ inch long nearly ¼ inch wide yellowish white. Lip large obovate broad one inch long and as wide in the widest part, centre thickened yellow with a crimson bar on each side, tip yellow, the rest pure white. Staminodes short ovate adnate to the filament ¼ inch long. Stamen rather short and broad, anther cells diverging at the top; crest ovate thin toothed bent upwards at an obtuse angle to the filament. Style considerably longer than the anther but shorter than the crest, stout. Stigma obcuneate with a short conical process behind the lip-like stigmatic surface.

Singapore in dense woods, Bukit Timah, Kranji, Sungei Buluh. Perak, Larut (King's Collector) 2886. Bujong Malacca.

E. pubescens n.sp. *Amomum elettarioides* Baker Fl. Brit. Ind. *Amomum* sp. Griffith Notulæ asiaticæ III. 417. Elettaria sp. Tab. CCCLII. 2.

Stems stout as much as half an inch through at the base about two feet tall, base covered with sheaths, above leafy Leaves about 5 or 6 oblong lanceolate cuspidate softly thickly. pubescent beneath above glabrous 6 to 8 inches long, 1½ to 2 inches wide, petiole ¼ inch long, sheaths about three inches, ligule very short. Floral stems as much as two feet long, often much shorter usually numerous, rather slender. Spikes usually distant short one inch or less long bases covered with ovate scale-leaves. Bracts ovate lanceolate ½ an inch long pubescent ribbed edges ciliate. Flowers in pairs. Calyx slender enlarged upwards an inch long lobes linear acute, covered with long silky hairs, nearly or quite as long as the corolla tube. Corolla tube thick enlarged upwards pubescent with silky hairs, lobes narrow linear oblong obtuse ½ an inch long white. Lip about an inch long obcuneate obtuse pubescent in the centre. Stamen filament broad, connective rather large three-lobed, central lobe largest. Style stout stigma cup-shaped.

Penang, Waterfall (Curtis 2276) Penara Bukit (Ridley 7236). Negri Sembilan, Foot of Bukit Tampin (J. Goodenough).

This grows in masses in thickets and waste ground often

near villages whence it is called Pua Kampong. It flowers in March and May. There can be little doubt that this is the *Amomum* of Griffith on which Baker's *A. elettarioides* was based. His description and drawing *Elettaria* sp. are fairly accurate. The three-lobed anther crest is not very clear however. There is a large rounded lobe at the back behind the stigma and the angle above the anther tips are somewhat drawn out. Jack's *Amomum biflorum* is probably the same thing though he says that the leaves are quite smooth except the midrib. He obtained it in Penang. The pubescent leaves and flowers and short corolla tube hardly longer than the calyx distinguish it from *E. latiflora* to which it is most nearly allied.

E. longituba Ridl. Trans. Linn. Soc. iii. 382.

Stem tall. Leaves oblong lanceolate cuspidate two feet long by two inches wide inequilateral at the base tapering into the petiole glabrous above, woolly pubescent beneath nerves very close, petiole one inch long, pubescent, ligule short pubescent. Flowering stems stout, becoming almost woody when fruiting and then $\frac{1}{4}$ inch through, very long. Spikes numerous about half an inch apart. Sheathing leaves oblong cuspidate dark brown two inches long and nearly an inch wide. Flowers in pairs. Calyx tube two inches long slender enlarged above, tip ovate, three toothed. Corolla tube $\frac{1}{4}$ inch longer than the calyx, lobes oblong obtuse rosy one inch long and $\frac{1}{4}$ inch wide. Lip obovate crenulate $1\frac{1}{4}$ inch long, white, with four pink lines in the middle, tip yellow. Stamen filament narrow pubescent crest 4 toothed. Stigma club-shaped, apex flat. Capsule globular white an inch through containing many triangular compressed black seeds.

Pahang, Tahan River (Ridley 2403). Selangor, Gunong Hitam. (Goodenough). Upper Perak at 300 feet elevation (Wray 3586).

The great size of the plant, and the large bracts, or rather sheathing leaves and long graceful calyx tube distinguish this remarkable plant. The leaves distributed with my plant No. 2403 I find really belong to it as Wray's plant has exactly similar ones. The Bukit Timah plant alluded to in the Trans. Linn. Soc. lc, is a large form of *E. latiflora*.

E. multiflora n. sp.

Rhizome far creeping woody. Stems tall rather stout nearly half an inch through. Leaves numerous lanceolate cuspidate glabrous shortly petioled, one foot long two inches wide, ligule short rounded, sheath about three inches long Flowering stems over two feet long slender, branched. Spikes secund very numerous and close together, sheathing leaves oblong cuspidate ribbed $\frac{1}{2}$ inch long by $\frac{1}{4}$ inch wide. Flowers five or six in a spike, rather small. Bracteoles lanceolate short. Calyx tube very slender one inch long, lobes equal oblong lanceolate cuspidate pubescent, points ciliate $\frac{3}{8}$ inch long. Corolla tube as long as calyx lobes, lobes obovate spathulate $\frac{3}{8}$ inch long more than $\frac{1}{4}$ inch wide white. Lip entire obovate pubescent white with a central yellow bar and red markings $\frac{1}{2}$ an inch long. Stamen filament broad, crest rounded rather small.

Sumatra on the Kelantan river near Siak (8972).

A very distinct species in its slender flower stems crowded with spikes each containing five or six small but pretty flowers only one or two of these however are out at once. I found it growing in a dense jungle swamp, the stems creeping through almost liquid mud, decaying leaves and water.

GEOSTACHYS.

Rhizome stout woody, not subterranean, with stout roots. Leafy stems two or three feet tall with lanceolate cuspidate leaves, glabrous, petioled. Scapes lateral usually short decurved so as to lie on the ground (in one species erect). Flowers secund, two or three in a dry brown papery bract on a short peduncle, projecting but little from the involute bract. Calyx tubular spathaceous with an entire cuspidate limb, corolla tube shorter than the calyx, thick, lobes oblong as long as the tube, lip entire obovate as long as the corolla. Stamen with a short filament and linear anther with a small rounded crest or none, staminodes none.

This genus is closely allied to *Alpinia* with which it was doubtfully placed by Baker under the section *Geostachys* which I have reserved for its generic name. It differs in the flowers being borne not on the ends of the leafy stems, but in lateral leafless ones, also in the peculiar dry brown bracts which are

rolled round the flower, and the curious tubular calyx with an ovate limb ending in a long point. The rhizome usually very woody stands above the ground often supported on its roots for some height. The coloring of the flowers in all that I have seen alive is the same, buff yellow, more or less ornamented with red spots. The species *G. elegans* from Mount Ophir, is peculiar in having its inflorescence erect on a slender stem and not lying down upon the ground.

G. decurvata n. sp. *Alpinia decurvata* Bak. l.c. p. 257.

A large tufted plant with a stout rhizome. Stems stout 4 or 5 feet tall strongly ribbed when dry. Leaves lanceolate acuminate one foot and a half long and three inches across glabrous close-veined, petiole 2 inches long, ligule $\frac{1}{2}$ an inch long oblong ovate truncate, sheath ribbed when dry. Scapes deflexed base suberect covered with numerous dry long sheaths 12 to 14 inches long, floriferous portion deflexed or horizontal, with about 20 secund flowers, pedicel $\frac{1}{2}$ an inch long. Bracts at base $\frac{1}{4}$ inch long lanceolate acute. Flowers in pairs included in brown boat-shaped mucronate sheaths one inch long. Calyx spathaceous as long as the corolla tube. Corolla tube not projecting beyond the bract, lobes lanceolate obtuse, half an inch long buff color. Lip one inch long obcuneate oblong apex rounded darker colored than the petals. Stamen with linear filament, anther linear with a small rounded petaloid crest. Capsule elongate glossy dark red.

Perak, Maxwell's Hill (Ridley 5189) (King's Collector 6310).

G. secunda n.sp. *Alpinia secunda* Bak. l.c. 257.

Stems stout and tall, leaves narrow lanceolate, over a foot long, one inch and a half wide, glabrous, petiole one inch long, ligule $\frac{3}{8}$ inch long. Scapes deflexed six inches long base covered with large dry lanceolate acute sheath leaves 2 inches in length, pubescent, rachis and pedicels hispid. Flower spike numerous crowded secund, peduncles $\frac{1}{2}$ inch long, flowers four in a spike. Bracts one inch long ovate lanceolate cuspidate pubescent. Calyx spathaceous with a long cusp $\frac{1}{2}$ an inch long. Corolla tube shorter than calyx, lobes oblong lanceolate $\frac{1}{2}$ an inch long. Lip oblong obtuse longer than the corolla lobes. Stamen fila-

ment short anther linear parallel, no crest. Style little longer.

Perak (Scortechini 381).

G. rupestris n. sp.

Rhizome stout with very long pubescent roots. Leafy stems stout, leaves broadly lanceolate cuspidate glabrous 8 inches long by 1½ wide, ribs close elevated when dry, petiole short. Scapes about 3 inches long decurved, bases covered with large dry sheaths the uppermost lanceolate acute ribbed one inch long. Flowers secund pedicels glabrous ¼ inch long solitary. Bract ovate one inch long. Calyx ampliate spathaceous ovate cuspidate pink ½ an inch long longer than the straight fairly slender corolla tube, corolla lobes oblong lanceolate ½ inch long. Lip obovate rounded longer than the corolla, yellow with red markings. Stamen filament short, anther narrow linear with a small rounded crest.

Kedah Peak 3-4000 feet. June 1893.

This much resembles *G. secunda* but differs in its broader leaves, short pedicels and solitary flowers, besides being much more glabrous. The flowers are dull yellow with red spots on the lateral petals and lip at the base.

G. penangensis n.sp.

Rhizome stout woody covered with dry sheaths, raised about an inch above ground. Stems usually numerous about three feet tall slender. Leaves narrowly lanceolate cuspidate glabrous about a foot long one to one and a half inches across very shortly petioled, ligule ovate obtuse ¼ inch long. Panicles deflexed secund 3 inches long covered at the base by large brown papery sheathing bracts, rachis glabrous peduncles ¼ inch long pink. Outer bracts slightly pubescent ¼ inch long brown spathaceous enclosing a pair of flowers. Calyx spathaceous cuspidate one inch long. Corolla tube shorter red rather thick lobes subequal oblong obtuse ½ an inch long. Lip nearly an inch long and half an inch wide, three-lobed lobes short rounded, median lobe obovate rounded ocreous yellow minutely pubescent. Stamen longer than the lateral lobes of the lip, anther ¼ inch oblong with no crest. Style barely longer very slender. Stylodes yellow lanceolate conic, rather large.

Penang. Common on dry banks at 2000 feet alt. (Curtis 327). It flowers in June and July.

This is most nearly allied to *G. rupestris*, but has much narrower leaves and smaller flowers, and there is no trace of a crest on the anther.

G. elegans n. sp.

Rhizome stout and woody covered with dry brown sheaths, with very stout firm roots. Stems about 3 feet tall bases covered with brown sheaths, leaves narrow lanceolate acuminate about a foot long, and one inch broad glabrous, petiole $\frac{1}{4}$ inch long, ligule ovate obtuse $\frac{1}{8}$ inch long. Scapes erect $1\frac{1}{2}$ feet tall, the lower part covered with dry brown sheaths, lowest ones about 2 inches long obtuse, upper ones acute. Rachis pubescent. Panicle 5 or 6 inches long with very short peduncles each bearing two flowers enclosed in an ovate bract, outer bracts ovate mucronate pubescent brown $\frac{1}{2}$ an inch long. Calyx spathaceous brown acuminate longer than the corolla tube. Corolla half an inch long tube short, lobes oblong obtuse, buff. Lip obovate oblong retuse little longer than the petals. Stamen filament very short, anther oblong narrow, notched $\frac{3}{16}$ inch long, crest none. Style slender, stigma cup-shaped. Capsule orange globose $\frac{3}{8}$ inch long glabrous crowned with the dry calyx. Seeds angled.

Malacca on Mount Ophir, (Derry 603; Ridley 3137) Common up to 4000 feet elevation. A very distinct species with tall rather slender scapes, and smaller flowers than any other species. It grows in large tufts on rocks, and in the woods.

ALPINIA.

This is a fairly well marked genus, distinct in bearing the flowers in terminal panicles or racemes on tall leafy stems, the flowers numerous often large and showy, the corolla tube usually barely longer than the tubular calyx, the lobes linear or oblong, the lip large obovate rolled round the stamen, (Catimbium) or small narrow lobed, (Hellenia) staminodes sometimes absent, or horn-like subulate processes rarely broad and spathulate. The stamen long, fleshy, the anther thick, crest absent (Catimbium) or well developed (Cenolophon). The fruit a globose or cylind-

ric capsule, orange colored, green, or brown, black dry dehiscent pubescent or hairy seeds numerous angled small enclosed in a sweet pithy aril, aromatic.

The genus is confined to East India, China, and North Australia. Many species are cultivated for their beautiful flowers, some especially *A. Galanga* and *A. officinalis*, the Galangals for their aromatic rhizomes. The species have been arranged in four sections, viz., *Ethanium*, with the buds not enclosed in large bracteoles, and no anther crest, *Catimbium* with large bracteoles, and no crest, *Hellenia* with a small anther crest and *Geostachys* which I would exclude as a distinct genus. This grouping is not however quite satisfactory as it separates closely allied plants, while placing very different species together. Nearly all fall readily into three groups which indeed might be called genera, viz.,

(A). Hellenia. Flowers small, white or pink, lip narrow not convolute often bifid. Anther usually crested. Fruit small globose few-seeded.

(B). Catimbium. Flowers large, lip broad obovate convolute, red and yellow. Anther not crested, fruit globose, large, seeds small numerous.

(C). Cenolophon. Flowers large, lip entire oblong orange anther crested. Fruit usually cylindric or fusiform, seeds large few.

Hellenia.

Lip entire obovate.	*A. conchigera.*
Lip „ narrow oblong.	*A. secundiflora.*
Lip bifid, spathulate	*A. Galanga.*
„ lobes narrow, linear, no anther crest.	*A. melanocarpa.*
„ „ „ „ anther crested.	*A. scabra.*
„ four-lobed	*A. rosella.*

Catimbium.

Panicle or raceme lax, bracts oblong or boat-shaped.

Staminodes absent, bracteoles small caducous.	*A. mutica.*
„ bracteoles large boat-shaped.	*A. assimilis.*

Staminodes subulate glabrous, corolla orange. *A. Rafflesiana.*
" " white
" " lip broader than long *A. nobillima.*
Staminodes short blunt hairy. Lip longer than broad *A. latilabris.*

Cenolophon.

Raceme lax nodding flowers large *A. petiolata,*
Raceme erect, dense flowers smaller.
Leaves base unequally cordate *A. macrostephanum.*
base narrowed, blade lanceolate *A. vitellina.*
" blade ovate broad *A. cannaefolia.*
Aberrant plant, with cap-shaped bracts, and spathulate staminodes *A. comosa.*

Alp. Alhugas Rosc. *A. calcarata* Rosc. *A. bracteata* Roxb. and *A. nutans* Rosc. are all mentioned as occurring in the Malay peninsula by Mr. Baker but without any locality or collector's name. I have not seen specimens wild or even cultivated of any except the last, which was formerly cultivated in a few gardens.

A. conchigera Griff. Notul iii. 424, Ic. Pl. Ast 354.

A dwarf plant about two feet tall, with an aromatic rhizome. Stems slender 6 feet tall pale green. Leaves oblong glabrous obtuse with a very short point light green, edges ciliate, one foot long about 3 inches wide, petiole broad $\frac{1}{2}$ an inch long, ligule thin short rounded pubescent. Panicle erect about a foot long, Branches short. Calyx short thick rounded, teeth 3 triangular obtuse equal and regular $\frac{3}{16}$ inch long. Corolla tube very short, lobes white oblong elliptic blunt, hooded $\frac{1}{4}$ inch long wide much shorter than the stamen. Lip obovate with two short teeth at the base triangular acute sides turned up, yellowish white with 4 red streaks on each side. In the centre at the base is a retuse callus edged with pink and a red spot on each side. Stamen yellow curved, as long as the lip, anther short elliptic, cells divergent at the tip and converging below; $\frac{1}{4}$ an inch long. Style projecting beyond the anther, stigma cup-shaped. Capsule globose red.

In damp open spots. Malacca, at Umbai; Chenana putih. Province Wellesley, Kubang Semang; (Curtis). Johore, Kwala

Sembrong (Kelsall) Perak, Kwala Kangsa. Pahang, Rumpin river. Also Chittagong.

The Lankwas Ranting of the Malays.

A. melanocarpa n. sp.

Hellenia melanocarpa Teysm and Binn. Pl. Hort. Bogor. cult. p. 328.

Stems tufted two to six feet tall from a stout rhizome. Leaves lanceolate acuminate narrowed at the base about six inches long and two inches wide glabrous, petiole half an inch long, ligule as long entire. Panicle about six inches long, with short branches $\frac{1}{4}$ inch long usually 3-flowered. Bracts very small lanceolate cuspidate pink. Calyx tubular nearly $\frac{1}{2}$ inch long white. Corolla tube little longer, lobes oblong obtuse, white. Lip with a narrow base then dilated and bifid, lobes blunt, pink. Staminodes two small green teeth at base of stamen. Filament linear flat, anther oblong fleshy retuse with no crest. Style but little longer stigma cup-shaped. Capsule small globose black, or red.

Singapore. Kranji, Selitar, etc. Pahang at Kwala Pahang.

This is I think Teysmann's *Hellenia melanocarpa* which was obtained from Sumatra. It has much the habit of *A. conchigera* Griff. but can be distinguished by its pink bifid lip.

A. Galanga Sw. Obs. Bot. 8. *A. viridiflora* Griff. Notul. iii 423. Maranta Galanga. L. Sp. pl. 2.

A tall plant about 6 or 7 feet tall with numerous stout stems, Leaves lanceolate acute very finely striate dark green above lighter beneath with a thin white edge, 18 inches long $3\frac{1}{4}$ broad with a short petiole $\frac{1}{4}$ inch long, sheath striate deeply split, ligule entire rounded $\frac{1}{4}$ inch long. Bracts lanceolate acute $\frac{1}{2}$ an inch long. Panicle compact six inches or more long. Flowers numerous sweet-scented. Pedicels $\frac{1}{4}$ inch long finely pubescent. Calyx tubular very unequally trifid, $\frac{1}{2}$ an inch long, lobes ovate, white. Corolla tube no longer than the calyx, lobes recurved fleshy linear, apex cucullate, $\frac{3}{4}$ inch long green. Lip one inch long porrect, spathulate, claw narrow light green fleshy with two low ribs and a groove between, limb bifid white with red streaks on each side, sides curved up. Staminodes two short pointed

processes at the base pink. Stamen about an inch long filament broadly linear white, anther notched at the apex, bent at an angle with the filament, cells linear, fleshy, thick. Style very slender fusiform, stigma rounded. Stylodia ovoid blunt small. Fruit small $\frac{1}{4}$ inch long elliptic red with one or two rounded seeds only.

Commonly cultivated and long persisting after the ground is abandoned. This, the "Lankwas" of the Malays, whence its name Galanga, does not seem to be known in a wild state anywhere.

A. Zingiberina Bak. (Bot. Mag. t. 6944) the Siam ginger, much resembles this but is distinct in the form of the lip which has no distinct claw, but is obovate and notched all round the edge, and much less deeply bilobed.

A. scabra. Benth Gen. Plant. iii 648. Bak. lc. 256. *Hellenia scabra* Bl. Enum. 60.

A tall plant with stems abont six feet tall. Leaves lanceolate cuspidate a foot and a half long and two inches broad dark green (drying pale greenish) scabrid on the upper surface, petiole winged to the base $\frac{1}{4}$ inch long, ligule oblong truncate $\frac{1}{4}$ inch long. Panicle upwards of two feet long, upper branches short two or three lower ones usually six inches long. Flowers rather small on pedicels nearly $\frac{1}{4}$ inch long ebracteate, white. Calyx campanulate $\frac{1}{4}$ inch long, with three teeth. Corolla tube longer rather slender curved, lobes lanceolate oblong obtuse, $\frac{1}{4}$ inch long, dorsal one-hooded, white. Lip narrow shorter than the petals, deeply bifid lobes linear oblong. Stamen long filament linear slender, anther cells slightly divaricate, crest very short. Capsule globose smooth $\frac{1}{3}$ inch through.

This plant grows in woods on the hills at about 1000 feet altitude, Its general appearance is that of *A. galanga.* The leaves are only scabrid when dry.

Johore, Gunong Pulai. Selangor, Bukit Hitam. (Kelsall). Perak, Thaiping hills; Bujong Malacca. Kedah, Kedah Peak.

A. rosella n.sp.

A small tufted plant stems about 2 feet tall rather slender. Leaves lanceolate acuminate with a long point glabrous rather

stiff 8 inches long and one wide or less, petiole nearly $\frac{1}{4}$ inch long, ligule as long. Panicle absent 4 inches long, with a few short branches at the base, flowers in threes on short peduncles, small rosy. Calyx campanulate $\frac{1}{2}$ inch long lobes very obscure. Corolla tube longer dilated upwards, lobes short ovate oblong rounded. Lip 4 lobed with a short narrow claw two erect rounded oblong lobes and the median one divided into two narrow linear oblong obtuse lobes. Stamen considerably longer $\frac{1}{4}$ inch long, anther linear oblong with a small rounded lanceolate crest. Capsule globular black. Seeds 3 about inch through black, outer face rounded, inner one angled.

Borneo, Kudat (1897) Brunei Bay (Bishop Hose).

Allied to *A. melanocarpa* but differing in the very small flowers only $\frac{1}{2}$ an inch long, the short calyx rounded broad corolla lobes four-lobed lip and crested stamen.

A. secundiflora n.sp.

Leaves lanceolate acute one foot and a half long, 2 inches across glabrous, grey above when dry and glaucous beneath, petiole winged $\frac{1}{2}$ an inch long, sheath transversely wrinkled, ligule $\frac{1}{4}$ inch long obtuse. Panicle nearly a foot long, with a peduncle over six inches long, bearing several lanceolate sheathing bracts wrinkled transversely, the largest six inches long, branches pubescent short $\frac{1}{2}$ an inch long, flowers numerous secund. Bracts small ovate $\frac{1}{2}$ inch long. Calyx tubular one inch long, lobes 3 sub-equal ovate, apices mucronate pubescent. Corolla tube $1\frac{1}{8}$ inch long narrow funnel-shaped, lobes oblong hooded, Lip shorter than the corolla lobes oblong obtuse rounded with three strong veins. Staminodes flat wing-shaped ending in a linear subulate point inch long. Stamen filament broad, anther oblong not crested. Style slender, stigma cup-shaped.

Selangor. Bukit Hitam (H. J. Kelsall).

A dried specimen of this plant was brought by Lieut. Kelsall from Bukit Hitam some years ago, and it has never been collected since, either there or elsewhere. The tall panicle with narrow flowers all turned to one side of the rachis is peculiar.

A. mutica Roxb. Fl. Ind. i. 67. Roscoe Scit. Pl. t. 69.

From 3 to 6 feet tall usually rather slender. Leaves narrow lanceolate very acuminate tapering at both ends glabrous light

green, 18 inches long, and 2 inches across, petiole rather slender one inch long, ligule ovoid blunt $\frac{1}{4}$ inch long, brownish. Panicle short or long, 3 to many flowered, with several short branches rachis finely pubescent, sometimes nearly glabrous. A long linear green leaf-like bract encloses the whole inflorescence in bud. Bracteoles very small about $\frac{1}{4}$ inch long oblong white, very soon falling, the one in the uppermost flower often large enclosing the bud. Flowers in threes, pedicel $\frac{1}{4}$ inch long, as long as the pubescent ovary. Calyx narrowed at the base suddenly dilate above split about $\frac{1}{2}$ way down, three toothed $\frac{1}{2}$ inch long white. Corolla tube shorter lobes oblong about an inch long, white upper one oblong ovate lip indistinctly three-lobed, sides turned up, apex truncate crisped, orange with numerous red dots and veins, a raised dark red glabrous swelling at the base on each side. Stamen filament rather short channelled, anther buff, $\frac{3}{4}$ inch long, thick, apices of cells a little diverging. Stigma cup-shaped. Capsule globose orange-red, very minutely downy, splitting readily in three. Seeds numerous black or dark gray with a sweet white aril, aromatic.

Pulau Aor, and Pulau Dayong (Islands off the East Coast of Johore). (Feilding.)

This plant I have not met with in any part of the peninsula but it has long been cultivated in the Singapore Gardens where it grows very readily. There are two forms, one of which is short, with very narrow leaves, and panicles of two or three flowers, and another much stouter with broad leaves, a larger panicle and almost glabrous fruit. The former is the plant figured by Roscoe, the latter is the form collected by Mr Feilding and is the variety figured by Roxburgh. There is no trace of any staminodes. I found a monstrous flower on one plant with two complete polliniferous stamens, and between them a short linear subulate process, in which apparently the normally developed stamen was rudimentary and the two lateral ones developed. This may be compared with Roscoe's *A. dijissa* which is probably a specimen of this plant with all the flowers like this.

A. assimilis n.sp. *A. mutica* Hook. fil. Bot. Mag. t. 6908 (not Roxburgh).

About 6 feet tall. Leaves lanceolate acuminate narrow $1\frac{1}{2}$

foot long, 1½ inch broad glabrous dark green petiole 1 inch long, ligule ¼ inch long oblong blunt. Raceme 6 inches to a foot long rachis pubescent, branches few and short. Flowers rather distant. Bracteoles ovate white an inch long, calyx ¾ inch long enlarged upwards, 3 lobed, lobes short, white, corolla tube short ¼ inch long, lobes white upper one obovate obtuse one inch long, ¾ inch wide lower ones smaller, lip obovate obscurely three lobed 2 inches long, 1½ wide, median lobe rather short crisped orange thickly spotted with red and red veined; a pair of short thick conic fleshy processes thickly pubescent at the base. Stamen filament broadly linear, anther oblong ½ an inch long. Stigma capitate, slit transverse, ovary very pubescent. Capsule globose hispid orange. Seeds black angular.

River banks and damp spots. Johore, Kota Tinggi. Pahang, Pekan. Penang, Batu Feringgi (Curtis 2766): Province Wellesley Ara Kudah. Pulau Buru (Island South of Singapore).

This is easily distinguished from *A. mutica* with which it has been confused by the large white bracteoles covering the buds, and the glandular processes at the base of the lip which are distinctly elevated and often of some size and covered especially on the back with stiff silky hairs. The coloring of the flowers and habit of the two plants are quite similar.

Var. sericea.

Leaves lanceolate tapering at the base, broader and cuspidate at the apex, scantily pubescent above softly velvety beneath 13 inches long, 3 inches wide, petiole one inch long, ligule very short. Raceme a foot long, rachis silky pubescent, flowers numerous crowded, pedicels inch long silky pubescent. Bracteoles large ovate one inch long and as wide ribbed pubescent, persistent. Calyx short and broad spathaceous 3 lobed, lobes cuspidate, pubescent. Corolla tube very short and stout, lobes oblong silky ½ an inch long blunt. Lip obovate obscurely trilobed an inch long, yellow veined and dotted red apex rounded bilobed, glands at base elevated pubescent.

Cult. in Buitenzorg Gardens (No. 3.)

This plant closely resembles *A. assimilis* but differs in its pubescent velvety leaves, and very short silky calyx and corolla, the bracteole being considerably longer than the calyx which

again is longer than the corolla. It should probably be classed specifically distinct, but for the present I prefer to leave it as a variety of *A. assimilis.*

A. glabra n.sp.

Stem unknown. Leaves lanceolate acute, tapering at base, closely ribbed rather stiff and glabrous, $1\frac{1}{2}$ foot long 3 inches wide petiole 2 to 3 inches finely ribbed, ligule bilobed rounded $\frac{1}{4}$ inch long. Panicle shorter than the leaves erect lax, lower branches about 3 inches long, glabrous. Bracteoles caducous. Flowers in pairs. Calyx gradually dilated upward, $\frac{3}{4}$ inch long, lobes short broad truncate pubescent. Corolla tube slender as long as the calyx, lobes linear obtuse hooded $\frac{1}{2}$ an inch long. Lip oblong boat shaped, apex bifid lobes short blunt, $1\frac{1}{4}$ inch long. Staminodes short rather thick tapering upwards. Stamen $\frac{3}{4}$ inch long glabrous, filament rather narrow, crest ovate obtuse quite entire ovary small sub-globose glabrous.

Borneo, Santubong in Sarawak (Dr. Haviland).

This is very distinct from all the others of this section in its lax panicle with stiff spreading branches, the boat-shaped lip and the oval entire crest. The leaves too are much stiffer in texture and the whole plant is almost completely glabrous.

A. malaccensis Roxb. Trans. Soc. Linn. VIII 345. is an unfortunately named species. It does not occur here so far as I know but is a native of India. The Javanese and Moluccas plants described as of this species are not *A. malaccensis* but perhaps one of the next two described.

A. latilabris n.sp.

Whole plant about 12 feet tall. Leaves glabrous, except the midrib, petiole and ligule, 2 feet and a half long, 3 inches wide narrowly lanceolate tapering at the base, petiole an inch long, ligule sub-acute brown pubescent. Raceme sub-erect, many flowered 6 inches long, rachis stout pubescent very pale green, outer bracts oblong lanceolate blunt 2 inches long 1 inch wide, white tinted with rose, Inner bract ampliate trifid at the apex $1\frac{1}{2}$ inch long, pinkish white. Pedicels very short white pubescent $\frac{1}{4}$ inch long, ovary longer, pubescent. Calyx trifid at apex narrowed at base dilate above white tipped with rose. Corolla

tube as long as calyx, lobes very unequal, upper one oblong obtuse $1\frac{1}{2}$ inch long by $\frac{3}{4}$ inch wide, lateral ones much narrower adnate to lip. Lip $1\frac{3}{4}$ inch long and nearly 2 inches across, cordate, lobes not distinct apex narrowed shortly bifid lobes spreading acute; orange densely spotted with red, central bar and veins at apex deep red edge yellow. Staminodes curved crimson with a dark spot at base, shaped like the horns of an ox $\frac{1}{4}$ inch long. Stamen filament broad linear as long as the anther grooved white, base pink, anther $\frac{3}{4}$ inch long. Fruit globose, orange nearly glabrous.

Pahang, Pulau Datu, on river banks.

This is distinguished from *A. nobilis* by its nearly glabrous leaves smaller panicle and bracts, while the tip though resembling that of *nobilis* in form has much shorter terminal lobes. The fruit too is very different. It has long been cultivated in the Botanic Gardens and from cultivated specimens I take the description. The Pahang plant seems to be the same thing.

A. nobilis n. sp.

Stems about 6 feet tall and one inch through pubescent. Leaves oblong cuspidate base oblique 2 feet long, 6 inches wide dark green glabrous above velvety pubescent beneath, petiole stout one inch long brown velvety, ligule inch long bilobed lobes truncate. Raceme about a foot long enclosed in two very large sheath. Bract very large three lobed, lobes nearly separate white tipped carmine, 2 inches long and three across. Calyx one inch long spathaceous white 2 or 3-fid dilated upwards, pubescent. Corolla tube shorter than the calyx lobes oblong obtuse $1\frac{1}{2}$ inch long one inch wide white silkily hairy especially along the edge. Lip very large $2\frac{1}{2}$ inch long and 2 inches wide cordate bilobed lobes large oblong obtuse truncate strongly crisped, median bar of lip thickened with four obscure grooves, lateral lobes and disc of lip blood red with yellowish white spots in lines, apex lemon yellow with the nerves elevated crimson. A strong erect hairy keel runs vertically from the disc parallel to the stamen on either side, where are pustular elevations and in some flowers a horn-like spur. Stamen filament half an inch long broad flat pubescent anther very thick as long lobes divaricate at apex, cells brownish. Style longer recurved stigma cup-

shaped. Capsule round flattened at both ends orange stiffly hairy. Seeds numerous. Cultivated in the Botanic gardens 1888-1898 fl. November.

Pahang, Kwala Tembeling. Selangor, Ginting Bidai.

This superb plant has long been cultivated in the Botanic Gardens, but whence it was obtained is quite uncertain. It is the largest species known to me, and very distinct in its large white triple bracts tipped with pink, and its deep blood-red lip very broad and ending in two oblong undulated lobes. The leaves are remarkably velvety beneath.

A. Rafflesiana Wall. Cat. 6575. Baker l.c. 255.

Stems about 4 feet tall slender, leaves lanceolate cuspidate pubescent, 12 inches long by three wide, petiole $\frac{1}{2}$ an inch long, ligule oblong sheaths pubescent. Panicle short and compact, 2 to 4 inches long. Bracts oblong short. Calyx short, dilated upwards, mouth oblique red. Corolla tube nearly twice as long, lobes broadly lanceolate orange tipped red $1\frac{1}{2}$ inch long. Lip longer, broadly ovate sides upcurved, orange with darker veins. Staminodes two short deep maroon toothed processes. Stigma filament linear fleshy, anther oblong retuse. Style longer than stamen, stigma rounded. Capsule globose green $\frac{3}{4}$ inch long pubescent.

Singapore, Sungei Buluh; Changi; Tuas. Johore, Tanjong Bunga: Gunong Panti; Ulu Batu Pahat. Malacca, Sungei Hudang. Selangor, Bukit Hitam; Bukit Kutu. Perak, Dindings, Telok Sera; Maxwell's hill, Gunong Keledang.

This pretty plant easily distinguished by its short panicle of entirely orange colored flowers, occurs all over the peninsula from Singapore to Perak, inhabiting woods up to an attitude of 4000 feet. It is called Pua Munkang, and Tepus Kijoi. This plant commonly known as *Alpinia vittata* of Gardens, is quite different from this, which I believe is not in cultivation at all.

A. comosa n. sp.

Stems slender 6 to 10 feet tall, slender terete dark green. Leaves narrow lanceolate acuminate with long points edges serrate with short stiff hairs at the apex, about a foot long and

1½ to 2 inches across deep polished green, petiole none, ligule very short rounded. Raceme terminal erect standing at right angles to the stem about 6 inches long dense, rachis pubescent. Bracts conical cup-shaped acute white, falling off before the flower opens. Flowers numerous medium size on pedicels long. Calyx spathaceous white ½ an inch long. Corolla tube, infundibuliform white, a little longer, lobes oblong pubescent ½ inch long, nearly ¼ inch wide at the base obtuse, upper one hooded, white. Lip about ¾ inch long with broad upturned sides and a narrow deflexed apex minutely bifid rather stiff pubescent median bar thickened fleshy polished, white with a pale yellow base, a bar of deep crimson dots at the base on each side. Staminodes, inch long spathulate with a broad rounded apex rather stiff white with a patch of deep crimson dots. Stamen filament linear ½ inch long white. Anther ¼ inch long white a small but distinct oblong rounded crest longer than the stigma pubescent, stigma capitate green. Capsule cylindric 2 inches long ½ inch thick strongly ribbed, brownish ochre colored.

Kedah Peak in forests; cultivated in the Botanic Gardens it flowers in March.

This is a most aberrant plant. The bracts in the form of tall conical caps falling off as the flowers open, the large broad flat staminodes and the very curious long narrow fruit make it quite unique. It is very difficult to compare it with any other species, but it should probably belong to the *Hellenia* section.

A. involucrata. Griff. Notul. iii. 422. *Costus malaccensis* Koen. Retz. Observ. iii. 71.

Stems about six feet tall and half an inch through. Leaves oblong acuminate cuspidate 18 inches long by six inches wide glabrous above and softly pubescent below, petiole 1½ inch long purple brown pubescent, ligule bifid to the base lobes oblong truncate with hairy edges. Panicle pendulous short. Bracts oblong white at first but brown and withered before the flowers open. Floral bracts cup-shaped white ½ an inch long, encircling two or three flowers. Calyx tubular dilated upwards ¾ inch long, glabrous with three short bosses representing the divisions. Corolla tube thick, upper lobe oblong prolonged to a blunt point, 1½ inch long, lateral lobes shorter, oblong blunt all white pubes-

cent at the base and hooded at the apex, with a scarious margin. Lip ovate broad trumpet-shaped margins denticulate otherwise entire (rarely obscurely lobed) 2 inches long, 1½ broad orange with crimson spots and veins at the base, edge white. Staminodes irregular short with two or three points crimson. Stamen filament ¾ inch long pubescent, anther very thick, ½ an inch long pubescent, apices of cells separate, no crest, cells linear narrow. Style abruptly recurved at the apex, ovary silky. Capsule globose green. Shady woods and banks.

Johore, Gunong Panti. Malacca very common. Muar (Feilding). Selangor very common especially near Kwala Lumpur. Perak, Larut, Ipoh, (King 2296) Waterloo. Also at Sungei Kalantan, Siak in Sumatra.

Though Baker classes this as near *A. nutans*, Roxb. it is very different in many points. The curious cup-like bracts round the flowers, the hooded petals, the thick nearly cordate anther, and short compact panicle make it quite peculiar. The flowers are fertilized by a brown humble bee, and seldom fail to produce fruit, which is always green, never becoming orange as in other species. It is called Poko Gingin, and Kantan hutan by the Malays. A variety occurs in the Kinta valley at Ipoh and Bujong Malacca in which the flowers are colored as in *A. capitellata* with the calyx, tips of corolla and centre of lip red.

A. capitellata Jack Hook. Journ. Bot. i, p. 360.

Stems over six feet tall or more one inch through purplish brown pubescent. Leaves oblong cuspidate edges pubescent 2 feet long, 4 inches wide, petiole 3 inches long or less pubescent ligule large and hairy. Inflorescence a nodding obconic head 4 inches across, with very large ovate cuspidate thin bracts the lower ones three inches long and wide. Bracteoles short rounded cup-shaped, much shorter than the bracts. Flowers almost sessile hardly protruding. Calyx ½ an inch long, much dilated upwards with the base wider than the pubescent yellow, ovary (¼ inch long) obscurely three-lobed, the lobes rounded red. Corolla tube a little longer than the calyx lobes stiff, upper one an inch long and ¾ inch wide hooded with a stout blunt mucro which with the centre is red, the rest white lateral lobes obovate blunt the apex in the centre raised to a

boss red. Lip obovate with a bifid apex, sides convolute, edges crisped 1½ inch long by 2 wide, edge white, centre orange, thickly dotted with dark red, dots in lines. Staminodes adnate to the edges of the lip and to the base of the filament, short subacute deep brown pink shining. Stamen 1 inch long filament ⅛ inch wide glabrous yellowish, anther deeply emarginate pubescent yellow with pink dots on the back. Style as long as stamen, apex decurved, stigma sub-triangular with a linear slit. Capsule globose minutely pubescent green.

Woods, Province Wellesley, at Ara Kudah; Dindings, Gunong Tungul. A fine plant closely allied to *A. involucrata* but quite unique in its large obconic capitula of flowers, with very large bracts at the base.

Jack's description as far as it goes fits this plant very well, but it is not very complete. He obtained his plant at Bencoolen in Sumatra.

§ *Cenolophon.*

A. vitellina n. sp. *Cenolophon vitellinum* Horan. Prodr. 36. *Amomum vitellinum* Lindl. Journ. Hort. Soc. ii. 245. Bot. Reg. 1847, t. 52.

Rhizome stout branched. Stems numerous 3 to 3½ feet tall ½ an inch through dull green flattened and ribbed. Leaves lanceolate acuminate 10 inches long 3 inches across, dark green, petiole less than ½ an inch long ligule rounded usually split ½ an inch long edged with rufous fur, sheath deeply split. Panicle terminal with few branches much shorter than the leaves compact, about 4 inches long, rachis pubescent. Bracts narrow linear caducous 3 inches long green. Flowers sessile or nearly so. Calyx tubular green one inch long pubescent trifid split. Corolla tube as long as the calyx, yellow, lobes linear blunt erect, yellow one inch long, posticous one hooded. Lip longer than corolla flat oblong cuneate bifid at apex edges crispid, orange veined with darker color, and sprinkled with red dots, stamen filament shorter than lip flat pale orange. Crest very large three-lobed toothed. Staminodes two short red horn-like processes.

Penang Hill. Selangor, Dusun Tua.

This species was first described from a plant sent to Chiswick

Gardens, and stated to have come from Ceylon, which was evidently an error. It has been referred to *Amomum*; and to a new genus *Cenolophon* apparently on account of the well developed anther crest. It is however in every other respect a typical *Alpinia*. The lip being not rolled up as in most of this genus so as to enclose the stamen, the anther crest is strongly developed so as to direct the fertilizing insect to the nectary.

A specimen labelled *A. Wrayi* from Dr. King evidently belongs to this species, but the description in the Flor Brit. India does not at all agree with *A. vitellinum*, *A. Wrayi* being classed with the crestless Alpinias and compared to *A. calcarata*. I have therefore retained the highly appropriate specific name given by Lindley.

A. cannaefolia n. sp.

Stem stout 4 or 5 feet tall. Leaves ovate or oblong ovate narrowed at the base, apex broad cuspidate, glabrous one foot long, 6 inches wide, petiole 4 inches long. Raceme erect about 6 inches long, peduncle a foot or less, pubescent. Bracts linear, lowest one as much as a foot long, $\frac{1}{4}$ inch broad green, persistent. Flowers numerous pedicels very short pubescent inch. Bracteoles very small. Calyx dilate trilobed, pubescent $\frac{1}{2}$ inch long, lobes blunt tipped with hairs. Corolla tube slender, as long, lobes linear one inch long, blunt. Lip more than an inch and a half long oblong entire edges crispid. Staminodes none. Stamen one inch long, filament broadly winged pubescent, anther narrow, crest large three-lobed, median lobe much the largest oblong crisped. Style much shorter than crest ovary villous. Fruit oblong thick pubescent. Seed very large 2 or 3 only oblong $\frac{1}{4}$ inch long smooth black.

Selangor, Dusun Tua. Negri Sembilan, Bukit Sulu; Gunong Berumbun.

This resembles *A. vitellinum* but has very much larger leaves broader and thicker. The bracts at the base of the inflorescence are remarkably long and narrow and the ovary very villous. The plant is known to the Malays as Pua Minyak and used in medicine, a decoction of the leaves and roots being given in fever.

A. petiolata Bak. l.c. 255.

Plant about 3 feet tall, leaves few elliptic oblong narrowed at the base, long acuminate glabrous about 15 inches long and four wide, petiole 3 inches long, ligule $\frac{1}{4}$ inch long glabrous. Raceme slender pendulous, 6 inches long about 20 flowered pubescent, pedicels very short inch long. Bracts narrowly linear $\frac{1}{4}$ inch long or less. Calyx as long as the corolla tube $\frac{1}{2}$ inch, 3 lobed, lobes acute, white polished glabrous, except the lobes tipped with hairs. Corolla lobes oblong linear one inch long yellowish white pubescent hooded, sub-equal. Lip flat, (not rolled up) entire obovate, edges crisped $1\frac{1}{2}$ inch long, base pale yellowish, central barred, apex orange with red veins. Staminodes absent. Stamen filament linear oblong, anther broader, crest reniform undulate dentate emarginate, the centre fleshy deep red. Style projecting, stigma ovoid slit terminal large, ovary hispid. Fruit fusiform 2 inches long hairy.

On rocks and banks. Perak, Maxwell's Hill. Selangor, Bukit Kutu.

This has the largest flowers of any in the section, and is a rather handsome plant.

A. macrostephanus Rid. *Amomum macrostephanum* Bak. l.c. 243.

Stem "very slender 4-8 feet." Leaves narrowly oblong, base rounded cordate, lobes very unequal, apex acuminate glabrous 2 feet long, 3 inches wide petiole slender 5 inches long. Spike "3-4 inches long" peduncle long erect enveloped in the sheath of the topmost leaf. Bracts caducous ovary villous. Calyx $\frac{1}{2}$ inch long dilated bilobed, lobes rounded, pubescent. Corolla tube shorter slender, lobes linear minutely pubescent $\frac{3}{4}$ inch long. Lip oblong obtuse rather narrow, a little longer edges crispid. Staminodes short linear obtuse. Stamen shorter than the lip filament rather slender, anther hairy, crest very large three-lobed lobes truncate plicate.

Perak Hills, Larut Hills. 500-1000 feet (Dr. King's Collector).

MARANTACEAE.

This group abundant in South America is very restricted here, being represented by only 8 species belonging to two

genera. *Donax*, of which there are two species, is a tall stemmed plant much branched with ovate leaves, and slender panicles of white flowers, on zig-zag branches. *Phrynium*, is stemless, the leaves are usually large and long-stalked produced from the rhizome, the inflorescence, of simple or compound spikes, prole. duced directly from the root stock or from the side of the petiol There are six species.

Phrynium variegatum Hort, is an ornamental variety of the common arrowroot, *Maranta arundinacea* L. which has been cultivated in the Botanic Gardens Singapore for many years and was thence introduced into European Gardens, but its original home is lost.

Donax grandis Ridl. *Clinogyne grandis* Benth. Gen. Pl. iii. 651.
Maranta grandis. Miq. Fl. Ind. Bat. Suppl. 616.

A very large plant growing 15 feet or more high with smooth green bare stems an inch through, and eight feet tall, branches clustered and jointed on a thickened portion of the stem, arranged spirally thickened at the base and spreading. Leaves ovate acute a foot long and six inches wide base rounded glabrous dark green, the large nerves distinct, petiole an inch long, sheaths six inches or more, no ligule. Racemes slender numerous hanging from the upper leaf axils, about a foot long, rachis slender zig-zag. Bracts narrow lanceolate acute. Flowers rather distant opening singly white shortly pedicelled. Sepals lanceolate acuminate $\frac{1}{8}$ inch long white pubescent. Corolla tube $\frac{1}{4}$ inch, lobes as long lanceolate acute. Lip yellow oblong obovate obtuse with a large ridge towards the base. Stamen petaloid oblong, cucullate one broad with a large curved side lobe, antheriferous one very narrow linear. Style short. Fruit globose white $\frac{1}{2}$ inch long. Seed single (rarely 2) light brown globose with a groove on one side.

In woods. Common in the peninsula from Tenasserim to Singapore. Singapore, Bukit Timah, etc. Johore, Sungei Ulu Sembrong. (Lake and Kelsall) Malacca, Bukit Sedanan, Panchur, Tampin, Sungei Udang. Negri Sembilan. Tampin, Berumban. Pahang, Tahan river. Selangor, Caves Kwala Lumpur. Perak, Thaiping Hills, Telok Sera, Dindings. Siam, Bangtaphan

(Dr. Keith). Borneo, Rejang (Dr Haviland). "Bemban" of the Malays. The stems are used for making baskets.

Donax arundastrum Lour. Flor. Cochinchinensis p. 15. *Clinogyne dichotoma* Salisb. Trans. Hort. Soc. i. 276. *Phrynium dichotomum* Roxb. As. Res. XI, 324. *Maranta dichotoma*, Wall. Cat. 6614. *M. ramosissima* Wall. 6615.

Stems numerous about 8 feet tall nearly an inch through, branches dichotomous terete thickened at the base deep dull green, sheaths at the joints lanceolate persistent. Leaves elliptic base rounded apex acute, petiole thick $\frac{1}{4}$ inch long, sheaths sub-terete no ligule. Panicle 2 to 8 inches long erect or nearly so, with few branches. Branches slender zig-zag. Bracts lanceolate involute green one inch long. Flowers white opening one at a time, two to a bract. Pedicels short with a small ochre-yellow conic gland some way below the ovary. Sepals spathulate the upper one the largest $1\frac{1}{2}$ inch long $\frac{1}{4}$ inch wide at the top free nearly to the base, the lower ones narrower and more acute joined to the corolla tube for half their length. Petals linear obtuse. Lip small spathulate apex rounded bilobed with a tongue-shaped process in the mouth and a line of hairs down the centre. Petaloid stamen $1\frac{1}{2}$ inch long bilobed lobes rounded $\frac{1}{2}$ an inch across. Antheriferous stamen adnate to lip with a slender filament and narrow anther. Cucullate stamen bilobed at the apex. Style stout stigma horse-shoe shaped. Fruit globose.

Common on river banks in thickets. It is called "Bemban Ayer." Johore, Kota Tinggie. Pahang, Pekan and a long way up the river. Kelantan, Kamposa. Selangor, Langat. Perak, Kinta river (King 831); Ipoh. It occurs also in India, Siam (Bangtaphan, Dr. Keith) and the Eastern islands. (Celebes, Dr. Koorders).

Loureiro's description might very well and even better apply to the last species, but he quotes Rumphius' picture (Herb. Amboinense Book 6, t. 7. which is evidently this species. His name *Arundastrum* is quoted in the Flora of British India as *Arundinastrum*. It is *Arundastrum* in the two editions I have here. The plant is much smaller than *D. grande* but has larger flowers.

PHRYNIUM.

Ph. Griffithii Bak. l.c. 260. *Ph. spicatum* Griff. Notulæ iii. 418. (non Roxb.) *Hitchenia musacea* Bak. l.c. 225, *Curcuma musacea* Wall. Cat. 6596.

Plant forming very large tufts, about five feet tall. Leaves erect blade oblong subacute 2 feet long and 6 inches wide above light green beneath glaucous except along one edge quite glabrous, petioles long and slender three feet tall. Spikes from the base 4 to 6 inches long flattened on a peduncle about the same length. Bracts whitish distichous, the edges connate at the base with the points recurved cartilaginous, 2 inches long and $1\frac{1}{4}$ broad. Flowers in pairs, each pair enclosed in a thin white oblong bract flattened and thickened on one side. Pedicel short. Calyx split nearly to the base lobes narrow acuminate acute white thin and transparent, hardly $\frac{1}{2}$ an inch long. Corolla tube slender $\frac{1}{2}$ inch long, lobes oblong oblanceolate blunt reflexed white nearly $\frac{1}{2}$ an inch long. Stamen tube little longer than corolla tube, the petaloid stamen is so deeply cleft as to appear to be two organs each lobe is spathulate with a claw with two involute edges and a broad expanded limb. Cucullate stamen rather narrow, the apex of the hood rather acute, the lateral lobe short and blunt, the edges yellow. Lip oblong obovate blunt rather fleshy the crest not transverse as usual but almost parallel with the line of the lip short thick and tongue-shaped, a long hairy ridge runs along the lower part of the lip in the same direction. Style very stout rounded on the back and doubly grooved in front. Stigma depressed almost funnel shaped. Capsule an inch long, fawn-colored back rounded front keeled, 2 seeded, seed oblong with the back rounded and front flat, a small irregular white aril at the base.

Dense woods. Singapore, Bukit Timah, Jurong, etc. Johor, Gunong Panti. Malacca, Bukit Bruang. Negri Sembilan, Bukit Tampin. Pahang, Tahan river.

A common plant in the South. The flowers have a very sweet scent.

Ph. cylindricum n. sp.

A large tufted plant in the habit of *P. Griffithii*. Bak.

Leaves about six feet tall, blade oblong ovate base broad two feet long and 8 inches wide glabrous green above whitish beneath, petioles four feet long. Scapes rather slender about 8 inches long, spikes narrow fusiform six inches long. Bracts pale green ovate oblong truncate glabrous apices erect not recurved, reflexed and spreading in fruit. Flowers white, corolla tube $\frac{1}{4}$ inch long, lobes oblong. Lip fleshy ovate acute sides turned up. Cucullate stamen short truncate with a process on the side, white tipped with yellow. Petaloid stamen hooded, antheriferous one very narrow linear. Style stout.

Perak in the Kinta valley on the limestone rocks at Ipoh, and Kwala Dipang.

Closely allied to *P. Griffithii* but readily distinguished by its much more slender cylindric spikes.

Ph. jagoranum Koch. Wochenschrift. VI (1863) p. 358.

Rather a small kind often forming masses on the ground. Leaves solitary or two or three, the blade 6 to 7 inches long, oblong cuspidate 3 inches across, glabrous except the midrib on the back which is pubescent, grey green with darker patches running from the midrib above, or entirely light green, petiole 8 or 9 inches long slightly flattened npwards, the swelling below the blade pubescent. Flower spike from the root stock 2 inches long fusiform slender on a terete peduncle an inch long. Bracts about 4 green lanceolate acute. Flowers in pairs. Sepals lanceate acuminate acute inch long green. Corolla tube long slender dilated upwards $\frac{1}{2}$ an inch long white, lobes short oblong yellow. Stamen tube no longer than corolla tube. Cucullate stamen nearly entire hooded oblong with a lateral process apex orange, anther-bearing one petaloid with a rounded lobe on a linear base, anther on a narrow lateral lobe; petaloid one narrow linear oblong. Lip more fleshy oblong rounded edges incurved, glabrous, with a rounded process on one side on the inner face and a narrow linear lobe outside. Style very stout thickened in the middle. Capsule oblong oblique crustaceous green 2 seeded inch long. Seeds elliptic oblong with a rounded back and flattened and grooved ventral surface brown polished, the aril at the base oblong reddish with two long curved claws.

Selangor, Dusun Tua; and near Kwala Lumpur.

I have also I believe seen the plant in Malacca. The foliage is prettily marked and resembles that of some of the South American Calatheas. The flowers are not often produced and are very inconspicuous. The seeds have a very odd appearance, resembling some curious beetle, the seed itself representing the body, and the claw-like arms of the aril the legs of the animal. The plant was first described from living plants sent to Bertin from the Malay peninsula by Professor Jagor.

Ph. tapirorum Ridl. Trans. Linn. Soc. iii. 382.

A large tufted plant about six feet tall, leaves ovate, lanceolate blade 18 inches long, 8 inches wide, acuminate green. Spikes in a tuft from the side of the petiole with a stout peduncle two or three in a tuft about 4 inches long, with numerous ovate lanceolate brown bracts. Flowers white on short peduncles, 3 in each bract, an inch long. Bracteoles 2 thin bifid. Sepals linear subulate more than half an inch long. Corolla white tube curved dilated upwards rather thick, lobes oblong, apices rounded blunt recurved. Capsule oblong obtusely 3 angled $\frac{1}{2}$ inch long, three celled with a seed in each cell. Seeds narrow oblong.

Selangor at Ginting Bidai. Pahang, Tahan River.

The tuft of long spikes projecting from the side of the leaf stalk distinguishes this from any of our other species.

Phrynium malaccense n. sp.

A large tufted plant. Leaves tall about 3 feet, petiole terete glabrous, except at the base 8 inches long inch thick, blade 15 inches long, 5 inches wide, lanceolate cuspidate dark green above, glaucous green beneath, nerves very close and numerous, midrib thick covered with brown fur, otherwise glabrous. Head lateral from the petiole dense 2 inches across, with about 4 branches. Bracts lanceolate acute stiff hard green glabrous $1\frac{1}{2}$ inch long, $\frac{3}{4}$ inch wide. Flower spikes 5 or 6 on each branch, with 2 or 3 flowers in each spike. Bracteole lanceolate acute 1 inch long green. Flowers small fugacious, shortly stalked, stalk inch long. Calyx tube very short lobes lanceolate acute white hispid nearly as long as the corolla tube. Cor-

olla tube dilated upwards, lobes ovate blunt, recurved finely spotted with purple. Lip thin spathulate oblong, white with a transverse pink line across the apex. Stamens, the cucullate one falcate spathulate white the hood edged with yellow, the petaloid one obovate bilobed rounded white, the antheriferous one linear erect short. Style thick flattened behind. Stigma ovoid, ovary orange covered with white hairs. Capsule one to three angled cordate in outline a little over $\frac{1}{4}$ inch long red hairy. Seeds oblong angled black covered with a semi-transparent aril.

Common in woods in the hilly districts of the peninsula. Malacca, Bukit Danan, Panchur. Negri Sembilan, Bukit Muar. Selangor, Caves Kwala Lumpur, Pataling. Dindings, Gunong Tungul. Perak, Maxwell's Hill. Pahang, Tahan Woods.

This is allied certainly to Roxburgh's *P. parviflorum*, with which it has been confused, but that has yellow flowers, and only one seed in the capsule.

Ph. hirtum n.sp.

A plant forming fairly large tufts. Leaf stems stout 3 or 4 feet tall, blade broadly oblong with a broad base, apex acute 15 inches wide, 8 inches across, glabrous dark green young leaves with the backs red. Petiole 15 inches long, stout sheath near the inflorescence woolly. Head of flowers three inches through. Bracts oblong $1\frac{1}{2}$ inch long apex, broad truncate broken up into fibres. Bracteoles lanceolate acuminate acute glabrous. Peduncles nearly $\frac{1}{4}$ inch long. Flower $\frac{3}{4}$ inch long (white). Calyx sepals free almost to the base longer than the corolla linear lanceolate acuminate hispid. Corolla tube rather slender, lobes oblong lanceolate acute tipped with hairs. Lip oblong small. Stamen, cucullate with rather a long lateral process. Style very stout. Capsule globose obscurely three lobed glabrous $\frac{1}{2}$ an inch long. Seeds 3 large, the backs rounded sides straight and smooth.

Johore, Gunong Panti. Sungei Ujong. Selangor, Dusun Tua. Perak, Hermitage Hill; Ulu Kerling (King's collector). Penang, Government Hill (Curtis 2420).

A much stouter plant than *P. malaccensis* with larger leaves, hairy leaf sheath, and very different fruit.

Ph. basiflorum n.sp.

Rhizome rather long, leaves in a tuft on a very stout woolly stem, about 4 feet long, oblong base broad, apex cuspidate glabrous except margin hispid, finely striate. Capitulum large 3 inches through from the base of the stem between the leaves dense many flowered. Lowest bracts woolly inner bracts glabrous oblong lanceolate. Flowers in pairs. Calyx lobes free to the base linear setaceous $\frac{3}{4}$ inch long. Corolla tube a little longer lobes oblong lanceolate dark pink $\frac{1}{2}$ an inch long. Lip white ovate oblong broad $\frac{3}{8}$ inch long and broad, ridge large elevated rounded. Stamen narrow linear, ovary pubescent.

Negri Sembilan. Woods in Perhentian Tinggi, growing in large masses in damp spots.

CANNACEÆ.

Canna indica var. *orientalis* and *C. Warscewiczii* have established themselves in Kampongs and waste ground near towns in Singapore and a few other spots, but have no claim to be considered native anywhere in the peninsula.

MUSACEÆ.

The genus *Musa* is the only one of this group represented here, though farther east from Amboina to New Ireland are various species of the genus *Heliconia* several of which are cultivated in our gardens. The general form of the Banana is so well known that it is unnecessary here to give a special description of it. Three and probably more wild kinds occur in the peninsula, one of which *Musa Malaccensis* appears to be the parent of some of our cultivated bananas.

M. Malaccensis Ridl. Trans. Linn. Soc. iii. p. 383.

Stems rather slender about 10 feet tall and 6 inches through. Leaves about 8 feet long green, often barred with brown when young. Spike decurved rachis covered with brown hairs. Bracts lanceolate sub-acute brown. Male flowers $1\frac{1}{2}$ inch long curved white. Calyx boat-shaped with five teeth. Petal oblong white $\frac{3}{4}$ inch long. Stamens with flattened filaments and narrow anthers. Female flowers 16 in a row. Stamens $\frac{1}{2}$ an inch long abortive. Style thick, an inch long. Fruit sub-

cylindrical four inches long yellow. Seeds black angled, enclosed in an eatable pulp.

Common all over the main chain of the peninsula. Malacca, Selangor, Perak, Pahang.

M. flava Rid. l.c.

Leaves large 16 inches across green. Spike decurved pubescent. Bracts widely ovate obtuse 4 inches long, bright yellow. Male flowers 16 in each bract arranged in two rows much like those of the preceding. Females also 16 in two rows. Fruit about 2 inches long, five angled.

Pahang at Pulau Tijau, Pahang River.

The very blunt spikes with yellow bracts distinguish this rare kind readily.

M. violascens Rid. l.c. 334.

Stems 8 to 10 feet. Leaves 10 inches across transversely ribbed and whitish beneath. Spike erect or nearly so, apex acute. Bracts lanceolate narrow acute violet or white tinted with violet, nine inches long and 2 inches wide, often persisting and reflexed after the flowers have fallen, rachis pubescent. Male flowers 6 in a single row in each bract, about an inch long. Females also 6 in a row. Fruit 3 inches long green, uneatable seeds $\frac{1}{4}$ inch long cylindric.

Common all over the main chain of the peninsula, often growing with *M. Malaccensis*. Pahang, Perak, Selangor, Sungei Ujong.

Easily recognized by its acute erect spikes with bracts colored like a purple brinjal.

LOWIACEAE.

A small group of plants forming a single genus *Lowia*, very unlike any other *Scitamineæ*, being stemless with broad dark green leaves like those of a *Susum*, and a short prostrate panicle of flowers from among the leaves. The flowers are medium size or large with a long almost solid calyx tube three long calyx lobes, two very small petals and a large obovate lip, five very short stamens, and a short stout style ending in a three-armed stigma. Capsule large, fusiform acute with numerous flask-shaped pubescent seeds.

There are two species in the peninsula and one in Borneo.

L. longiflora Scortechini, Nuov. Giorn. Bot. Ital. 1866, p. 308.

A large plant forming great tufts with erect dark green lanceate acute leaves, about 3 feet long and 4 inches wide tapering into the petiole. Flowers axillary enclosed in long sheaths solitary large. Calyx tube long, sepals 5 inches long and one across narrow linear acute purple. Petals one inch long yellow linear acuminate apex setaceous. Lip spathulate the limb ovate, 4 inches long and 2 inches across lilac. Stamens as long as petals, filaments short curved, rather thick, anthers. Style long and slender, longer than the stamen. Stigma arms linear with numerous processes at the ends.

Selangor, Ulu Langat, near the caves Kwala Lumpur. Perak, Ipoh.

This plant is exceedingly abundant in some places, forming great masses, usually in wet spots, but growing also in drier ones. It is however rare to find flowers, and I have only found them on plants which have been injured. They are not very conspicuous, being usually concealed among the leaves. It is known as "Lobak hutan" in Selangor.

L. maxillarioides Hook fil. Bot. Mag. t. 7351. *Protamomum maxillarioides* Ridl. Trans. Linn. Soc. iii. 383.

A smaller plant with numerous leaves in a tuft arranged distichously, lanceolate acuminate 8 inches long and 3 inches wide bright green, petiole 2 feet long sheathing at the base, often shorter. Panicle axillary about 3 inches long with a few shorter branches. Calyx tube purple 3 inches long, lobes (sepals) lanceolate acute deep purple spreading $1\frac{1}{4}$ inch long. Petals two very small oblong mucronate violet. Lip with a short claw, oblong obtuse white tinted with violet. Stamens short, filament thick curved, anthers but little longer. Style thick and short. Stigma large (in proportion) subcordate with three short toothed arms. Capsule large $1\frac{1}{2}$ inch long, fusiform pointed three angled, deep purple. Seeds $\frac{1}{4}$ inch long, flask-shaped brown, covered with short hairs.

Pahang, Pulau Tawar Woods.

Abundant there but I have never seen it elsewhere.

The Habits of Malay Reptiles.

By H. N. Ridley.

In putting together these few notes on the habits of some of our reptiles, I would commence by calling attention to the very valuable paper on the Reptiles and Batrachians of the Malay peninsula by Lieut. S. S. Flower, published in the Proceedings of the Zoological Society for December, 1896, page 856. This paper gives a list of all species recorded from this country, and I have made much use of it. The earliest important paper on the subject is that by Dr. Cantor, published in 1847, and a good number of kinds mentioned by him have not been met with since. Some were perhaps erroneously identified or wrongly localised, and some perhaps have disappeared. Others, however, have doubtless been overlooked, and that is especially the case in the tortoises, and the smallest lizards. Snakes are often preserved by amateurs, as are the showier lizards, but the other reptiles often escape collection. No better instance of this is that of the big Gavial *Tomistoma*, which was really first recorded as belonging to our fauna in 1896, by Wray, although it appears to be by no means rare in the Pahang and Perak rivers, and must at times have been the victim of the sportsman long ere this.

Tortoises.

There are several kinds of land tortoises to be met with here, and one of the commonest is the jungle tortoise *Geomyda spinosa*. It is rather a small tortoise about eight inches long, and of a dull red colour, just the colour of the rotting leaves in the streams of the jungle where it lives. Its head and feet are black, with pink spots. When young the edge of its shell is armed with spiny processes, whence its name, but these disappear as it grows older. It seems never to leave the damper parts of the forests, and is seldom far away from the small streams. These tortoises eat all kinds of vegetable substances, fruit of all kinds and leaves, and I once found two small ones greedily devouring

a fungus. Their tenacity of life is, as in most tortoises, very great. I once brought one from Bukit Timah, where they are common, for the Museum, and on preparing its skeleton it was found that by some accident the carapace had broken clean across, and though the edges had not joined, the damage had been evidently repaired as well as possible some time previously. Afterwards I heard that some visitors to the bungalow had found one of these tortoises and carried it up to the top of the turret, whence it had fallen upon the gravel path, and though it seemed much injured, it managed to creep away, and I have little doubt that this must have been the same tortoise which had thus recovered from this severe injury.

Cyclemys platynota, the flat-backed tortoise, is a rather larger animal, recognised by a peculiar flattening on the top of its shell. It is usually a very shabby, disreputable looking animal, with a dirty brown irregular carapace. It is less often noticed, as it is even more aquatic than the jungle tortoise, remaining under water most of its time. It seems to be abundant in the river at Selitar bungalow, where Dr. Hanitsch got several, and it has turned up in the Botanic Gardens, once in the Lake and once in a smaller pond, where it was devouring the waterlilies. In captivity it will eat rice, fish, leaves or fruit.

The box-tortoise, *Cyclemys amboinensis*, is very common in the rice fields in Malacca, and used to be common in Singapore, but is now getting scarce here, as its haunts are being either drained or cultivated or built on. I have been told that it was formerly plentiful on the ground on which is now the Tanglin Market. It is a very pretty little tortoise with a very round back, black and smooth, the lower carapace yellow, and its head black with a bright yellow band on each side. The end plates of its under shell are jointed upon the others, so that it can close itself entirely within its carapace if alarmed, whence its name of box-tortoise. It is very fond of the water and often remains therein, only projecting its snake-like head above the surface. However, it often leaves the water and rambles about, especially in the evening, in search of food, and I have seen them run over by bullock carts on the roads in Malacca. They are very easily kept and are quite omnivorous, eating fish, boiled

rice, frogs, fruit, and green vegetables with equal pleasure. They lay rather large, oblong, blunt-ended, white eggs, two or three, or as many as five at a time, which they bury in the sand. The shell is remarkably hard for a reptile's egg, and the eggs, two inches long, are very large for the size of the tortoise.

The large land-tortoise, *Testudo emys*, does not occur in Singapore, but is not very rare in Perak, especially in the Dindings, and is said to occur in Penang also. I got a very fine female at Telok Sera, in the Dindings, which laid two eggs shortly after I got it. They resembled those of the box-tortoise, but were larger. This tortoise lives in the drier parts of the woods, and does not seem to care about water at all. It eats all kinds of leaves voraciously.

Several kinds of snapping-turtles *(Trionyx)* are recorded from the peninsula, but the commonest is *Trionyx cartilagineus*, a very large flat turtle, the shell of which is covered with a leathery, dark gray skin, often marked with olive spots, and which is continued as a flange all round the shell. The head and neck are gray with small yellow spots, and the snout is long and pointed, giving the animal a very ugly appearance; the feet are very thick and powerful, ending in sharp claws.

These turtles usually live in tidal rivers, but sometimes get into ponds. They rarely leave the water, but may be seen pushing up their heads above the surface from time to time. One was caught in the ditch by the Museum some years ago, and was transferred to the Gardens' lake, where it eventually became very large, and attacked some of the water birds with great ferocity, killing and devouring some flamingoes. It was eventually trapped and destroyed. Though these animals are properly carnivorous, they seem very fond of boiled rice, and the ones in the Garden lake used always to come and feed off the rice put down for the water fowl, and those in captivity are fed for the most part on boiled rice made up in balls. The Chinese are very fond of these turtles, and their flesh fetches a high price in the markets. The Malay name for them is *Labi-Labi*.

The Chinese have a superstition about tortoises, which they consider emblems of longevity, the tortoise, with the dragon and phoenix being the first three animals in the world when it was created. They catch or buy as many tortoises of

any kind as they can get, and after writing their name on them release them in a suitable spot. These tortoises are supposed to bear away the sins of the men whose names they bear, and no Chinaman will kill or buy a tortoise so inscribed for fear of being burdened with the sins of some one else. This probably accounts for the appearance of a considerable number of turtles and of the flat-backed tortoises in the Gardens lake, within late years, and the temple of tortoises in Penang is also used as a place of safety for sin-bearing tortoises.

In the seas round the peninsula four kinds of turtles are to be met with. The well known green turtle, *Chelone mydas;* the Loggerhead, *Thalassochelys caretta;* the Leathery turtle, *Dermatochelys coriacea;* and the Hawks-bill, *Chelone imbricata.* The habits of the green turtle are familiar, from books at least, to every one. It is still common enough along our sandier coasts, and I have often seen it putting up its head above water, especially in the early morning, off Lumut in the Dindings, and elsewhere. It is a vegetable feeder, eating seaweeds, and probably, as seaweed is very scarce in our waters, it also eats the Setul, a grass-like flowering plant, common in muddy spots round the coast. The logger-head is a large turtle which feeds on marine animals, and is recognized by the yellow markings on its head and flippers. It may often be seen just outside Singapore harbour, putting its head above water, and then diving again, remaining a long time under water. The huge leathery turtle, has only once appeared on our coasts, a large specimen now in the Museum having been caught at Tanjong Katong. It is also carnivorous, and like the last-mentioned turtle is uneatable. The Hawk's bill occurs in the neighbouring seas, and I have seen live ones brought into Singapore, but whence I could not discover. Some years ago, while up the Sepang river in Selangor, a good way above tidal waters, I saw a turtle slip off the bank into the river. It swam very fast down stream, pursued by the boatmen, and then turned and came past me quite close. Its paddles were moving very rapidly and it lay right over almost on its side, as if to reduce the amount of friction against the water as much as possible. It eventually got into a deep hole, whence we could not get it out. From what I could see of it, it appeared to be a Hawk's bill.

Crocodiles.

Crocodiles. The common crocodile is *Crocodilus porosus.* Cantor mentions *C. palustris*, the Mugger of India, as occurring in Penang, but as being less common than the other kind. Lieut. Flower has seen a young specimen from Singapore in the British Museum and Mr. Butler has got one in Selangor. This crocodile is distinguished by its shorter and broader snout, and by having five teeth in its premaxilla, and not four only as the common kind has. It seems also on the whole to be a smaller animal.

The common crocodile varies in colour, being sometimes black and yellow, at others entirely black. The Malays consider the yellow variety as being the most dangerous. This species is strictly speaking a tidal river or marine animal. It seldom goes far up rivers beyond tidal waters, and it sometimes goes very far out to sea. I saw the skull of one at Cocos Island, which had turned up there some months before my visit, and which must have swam at least 200 miles in the sea ere reaching the islands. They sometimes leave the water and go for some distance inland, apparently trying to get across from one river to another. I saw one which had just been killed in a coffee estate near the caves at Kwala Lumpur, where it had been found wandering about among the coffee, at no great distance from the river, however. Of the ferocity and cunning of this, our most dangerous wild beast, there is no need to write, it is too well known; but I will mention one incident concerning it. Some years ago, a Malay forest-guard was in a mangrove swamp at low tide, the water where he stood being only a foot deep, when a crocodile suddenly rose out of the mud on its hind legs and bit him on the elbow. The man tore his arm out of its mouth, and it rushed off. The Malays' theory on the subject was that the man was standing on or close to the animal's nest, but it seems curious that the crocodile should be buried in the mud in such a manner, and that it should spring at his arm and not bite him on the leg, which would be the nearest part to him. In captivity the crocodile is rather a stupid animal, but a young one kept in the Gardens has learnt to come out of the water for a piece of meat when whistled to.

Of the habits of the Gavial, *Tomistoma Schlegeli*, but little is known at present. It occurs in the Perak and Pahang rivers, where, above Kwala Tembeling, I have seen tracks on the sand banks probably of this species. Sportsmen far up the larger rivers should keep a look-out for this animal, as well as for the Mugger, for it may be much more widely distributed than at present appears.

Lizards.

Our largest land lizard is the Monitor, *Biawak* of the Malays, often erroneously called an Iguana here, *Varanus salvator*. This animal attains a length of seven feet, but its tail forms, a large proportion of that length. It always lives near water, either river or pond, or the sea, in which it quickly takes refuge when pursued. It dives very well, and remains a long time under the water. If it is unable to get into water, it will quickly climb a tree when alarmed. It gallops at a great pace when frightened, though very clumsily, and the noise it makes dashing through the bushes is out of all proportion to its size. When cornered, it defends itself by lashing out with its tail, and making a puffing noise like a spitting cat. It also bites very fiercely. It is carnivorous, feeding on birds, rats, fish and insects, often attacking poultry. When a rat is given to it, it seizes it in its mouth and shakes it like a dog, then after biting its body all the way down till all the bones are broken, swallows it whole. In captivity I have never heard it make any noise but the spitting sound, but Malays have told me that a loud barking ha-ha-ha which I have heard in swamps is the cry of the Biawak. The eggs are large and white, with a soft shell like that of a turtle, and are deposited in holes in sandy ground and covered up. I once found at Bruas, in the Dindings, a monitor laying its eggs in a shallow hole. The Malays, however, have a story to the effect that when the eggs of a crocodile hatch, all the young ones which go towards the water become crocodiles and those which run on the land become Monitors.

Besides the common Monitor, *V. salvator*, there are three other kinds to be met with here. *V. flavescens*, Penang and Jelebu; *V. nebulosus*, Penang and Malacca; and *V. rudicollis*, Malacca. These are all smaller than the common kind.

The pretty sand lizard, *Liolepis Bellii*, about a foot long, and beautifully ornamented with blue and red, is very common on the sandy plains of the Pahang river, and I have also seen it in Malacca, at Pengkalan Kumpas, and at Bruas, in the Dindings. It can be seen sitting in the sun in the heat of the day, sunning itself, but never far from its hole, into which it darts with surprising rapidity.

The Chamæleon Lizard, *Calotes cristatellus*, is very common in all gardens. Its ordinary colour is bright green, but when vexed it turns to a dusky brownish colour, whence its popular name. When alarmed it runs very fast on the ground, holding up its long whip-like tail, to the nearest tree or post, up which it climbs, and if this is not high enough to be safe, springs on to a higher one. If a human being happen to be in its way, it does not delay to run up to his shoulder or head and jump off from there. The distance it can jump from tree to tree is very considerable, having regard to the size of the animal. It generally lays two eggs at a time, but Lieut. Flower found females of another species, with as many as seven or eight eggs in them, the eggs are about an inch long, narrow cylindrical blunt at both ends, and enlarged rather abruptly in the middle. They are white and leathery. The lizard places them side by side on the ground in a damp spot and leaves them, not attempting to conceal them. If attacked by a dog the *Calotes* runs for a short distance, and then turns and rushes at its enemy with open mouth, springing at its nose and biting sharply, but is soon tired out and killed. In spite of its teeth and the spines that protect its head and neck, it frequently falls a victim to the attacks of sparrow-hawks and snakes, and the Monitor is also very fond of it. The Malays hold it somewhat in horror, as being one of the forms in which wizards send out their imps to annoy their enemies.

The flying lizard, *Draco volans*, is at times very common. It appears to move about in flights, for while perhaps for some months hardly any are to be seen, at other times one may see half a dozen in a morning. They appear usually in the hottest part of the day, sailing from tree to tree, always selecting trees with grey smooth bark of the same colouring as themselves. Furthermore they nearly always choose the same trees for their

route, so that when they appear in the Gardens one knows exactly which tree one will find them on. When they alight on a tree they run up, puffing out and contracting the conical pouch in the throat, which is bright yellow in the male and blue in the female, and licking up the ants, which form their chief food. When they have climbed sufficiently high, they spring off again spreading the wings (which are expansions of skin on the elongated ribs) after they are in the air, and closing them as they alight, Though they usually go in straight lines, they can swerve in their flight, apparently by lying slightly over on one side or the other. I have seen one avoid a bush which was in its line of flight in this way. The distance that they can cover depends on the height from the ground of the point from which they spring, for as in the case of all animals that fly in this manner (the flying squirrel and flying lemur), they descend in their flight ; but the longest flight I have measured was twenty-five yards, from a height of not more than fifteen. These animals are able to change colour, as the *Calotes* does, the blue ornamental patch on the head disappearing, and the whole lizard becoming of a brown hue, except the pouch, which retains its colour.

D. volans is by far the commonest species here, but there are four or five other kinds to be met with, which generally occur in thick forests, and are very difficult to collect, as they very qnickly fly out of reach, and can only be obtained with the gun.

The common Scinc, *Mabuia multifasciata*, a stout brown metallic lizard, ornamented with a glowing red patch along the side just below the head, is very abundant in the grass and along drains, creeping about when the sun is bright and hiding in holes and under roots when alarmed. When closely pursued by a dog, the Scinc will sometimes take to a tree, climbing up well out of reach, and when roughly handled it sheds its tail, as do the Geckos, the tail skipping about very actively for some minutes after it drops. It readily takes to water, diving in when frightened and remaining a long time below the surface. Besides this common Scinc, there are one other *Mabuia* and seven smaller scincs of the genus *Lygosoma* recorded from the peninsula, most of which are either very scarce or difficult to find or very

local. One, *L. jerdonianum*, seems to be absolutely confined to Pulau Tikus in Penang, having never been seen anywhere else. Every one in the tropics soon makes the acquaintance of the House Geckos, and the habits of these useful little insect killers are well known, and have often been described, but it does not seem to be generally known that at least eight species belonging to four genera inhabit our houses. In some houses the common one is *Gehyra mutilata*, a very pale c lored and rather small kind, in others the large dark brown *Gecko Monarchus* takes its place, or drives it at all events out of the verandah, which is evidently considered the best feeding ground by the house geckos. In other houses again quite different ones appear. The Siamese Tokay, *Gecko verticillatus*, a large kind with an exceedingly powerful voice, has been recorded from the peninsula, and even from Singapore, but this latter locality must be very dubious, We have, however, another very loud voiced one (probably *G. stentor)* in the forests, where it lives in hollow trees, and utters a very loud call.

Besides these house geckos, there are a number of jungle geckos, which live in holes in trees or under bark, only appearing at dusk. A very odd little one, *Gonatodes kendalli*, lives in cracks and holes under large rocks in the Bukit Timah woods. It is dark brown, and has an unusually long tail, which it often carries over its back coiled up like a watch spring when it runs.

Snakes.

The ordinary visitor to the tropics is filled with a nervous horror of snakes, always expecting to find most deadly kinds in the house or to be attacked by then if he sets foot outside. He conceives it his duty to slaughter all, even the most harmless and useful species, as soon as he sees them. Nor is his opinion altered by conversation with Malays, who assure him that even the most inoffensive of them are horribly deadly. Malays have pulled me back in horror when I was picking up a little *Typhlops*, a snake about the size of a moderate-sized earth worm, with a mouth too small even to nip a portion of one's skin, assuring me that it was a most venomous animal. The visitor, however, if of an observant turn of mind, discovers ere long that poisonous snakes are comparatively rare, and that cases of dangerous

snake-bite are exceedingly rare, and the risk of injury from snakes is so infinitesimal that it may be utterly neglected as one of the dangers of the tropics. Cases of death from snake-bite are from time to time recorded, but, usually at least, the snake is not identified, sometimes not even seen, and it is clear that there has been a good deal of guessing as to the cause of death. Good records of cases by persons who know the poisonous snakes by sight would be very useful. Death from snake-bite in India seems to be remarkably common, why should it be so rare here? The only really probable suggestion I have heard was made by a native who had lived in India, who pointed out that while in India the snakes mostly live on the ground, here they live high up in the trees, and there is a good deal in this; I have seen the green viper and hamadryad both brought down from the tops of trees forty feet high. Squirrels and tupaias, some of the rats, as also the birds on which these animals mostly live, reside high up and seldom come to the ground, and the snakes pursue them there, while the hamadryad pursues the other snakes. Another fact seems to be clear, which is that some snakes, notably the green viper, imagined to be very deadly, is indeed not nearly as dangerous as it is supposed to be, but of this more anon. It may, however, be pointed out that the most destructive of the Indian snakes are the cobra, the Tic-polonga or *Daboia* and the Krait. The two latter are absent from the peninsula, and the Cobra does not seem to be very dangerous here.

I should hardly have thought it worth while to allude to the serpent fascination myth, except that recently, at the British Association, a paper was read to disprove the popular error that snakes fascinate or mesmerise their prey before catching it. Anyone who has ever kept snakes knows that nothing of the kind ever happens, but like the theory of the imitative powers of apes and the fiction that the man-eating tiger is invariably an old animal which has lost its teeth, these popular errors seem to take an unaccountably long time to die. Snakes either quietly creep up to their prey, and seize it when asleep or resting, or wait in likely spots for the prey to come to them. Many, especially the larger snakes, are nocturnal or hunt only in the twilight, when their prey can hardly see them. The smaller insect-

eating snakes chiefly work by day. Most snakes are colored for concealment, and inhabit spots suited for their coloring. The green viper *(Lachesis Wagleri)* sits usually about 4 or 5 feet high in a bush, in a sunny spot, where its blue-black, green and yellow mottling is matched by the spots of light and shade on the bright green leaves. The python, again, with its light and dark brown carpet pattern, resting among dead leaves, or in the hollow of a tree, is equally inconspicuous ; even poisonous snakes, which sometimes are very gay with warning colors, are by no means as conspicuous as they appear. The beautiful *Elaps bivirgatus*, with its scarlet head and tail and deep blue body, is wonderfully invisible in the shadows of the woods, but when in danger it exhibits its brilliant coloring as plainly as it can, in order to warn the enemy that it is venomous, and can give a fatal bite if it chooses. *Callophis* is another genus of poisonous snakes that is brightly colored. In danger, however, it does not trust to its warning colors only, but beats its tail quickly on the dead leaves, making a rattling sound. A terrier which came upon one of these small snakes, and was about to kill it, stopped at once when the snake began to rattle its tail, and went away, evidently understanding the signal. *Bungarus* again, a large and dangerous black and yellow snake, makes the same kind of rattling. A poisonous snake will not as a rule waste its poison on an animal it cannot swallow, and naturally prefers to drive its enemy off by frightening it, if it can.

Snakes, like many of our wild animals here, know very well the conspicuity of motion, and when crossing an open space such as a road, where they are visible from some distance, usually remain perfectly motionless if an enemy comes in sight and they have no time to get into shelter. This is why they are more often seen on roads by persons driving or walking than elsewhere. Being alarmed when crossing from wood to wood, they remain motionless for some time, in the hope that they may be taken for a root or piece of stick. I have seen a terrier, who invariably pursues snakes when she sees them, jump over one lying on the path, mistaking it for a stick. Had it moved, she would have immediately killed it.

There are no less than one hundred and ten kinds of snakes recorded as occurring in the peninsula, and more than half of

these have been found in Singapore. A number have only been collected once or twice, and some of the records may be considered doubtful, but as only a small part of the peninsula has been yet collected in, we may expect large additions as time goes on.

One of the commonest is the Python *(P. reticulatus)*, the Ular Sawah of the Malays. It is perhaps the largest snake in the world, a specimen measuring 40 feet having been reported as obtained by a scientific expedition in Manila. Pythons of 20 feet in length are by no means uncommon here, and specimens of 26 feet are occasionally met with, but accurate measurements of larger ones are still required. The python is nocturnal in its habits, remaining concealed under bushes or fallen logs during the day, and wandering about at night in search of food. It eats squirrels and rats and birds, and often makes its way into a hen-house, where it not only eats half a dozen or more chickens in a night, but usually kills more than it eats. The larger ones will also eat dogs and cats, goats and pigs. A snake a little over seventeen feet long ate two black swans on the garden lake at the rate of one a month, and I have had a python of about 15 or 16 feet long brought me, which had just swallowed twelve ducks. On one occasion five pythons were put together into a large cage. The biggest was a little over nineteen feet long, another was between 17 and 18 feet, and the other three were from 12 to 15 feet in length. The biggest snake ate all the three smaller ones in two nights, and attacked the remaining one, which however succeeded in beating it off, not without being wounded. But although they are sometimes very voracious, they will often go without food for a very long period. A large one, twenty feet long, was fed on a good sized pariah dog, after which it refused food for nine months, when it passed the remains of the dog, and began to feed again. Another remained for seven months without food, in the same manner. Smaller snakes feed oftener, usually once a month, and sometimes even oftener than that. A hungry python strikes its prey with lightning-like rapidity, usually seizing it by the head, if it is small enough, in which case the animal or bird is killed by the crushing of the head. It then, turning its head down, encloses the prey in a coil and a half and proceeds to swallow it slowly. In the case of fairly large animals, and those that are not killed by

crushing the head, the prey is crushed by the coils. In the case of a swan swallowed by a fair sized python, the head was crushed, evidently by the first bite, but the bones of the body were not broken at all, although the bird was very much thicker than the python. In some books it is stated that the prey is smothered in the coils, but as a matter of fact, the bite of the python is severe enough to cause instant death in most of the smaller victims, and the contraction of the coils crushes the larger ones. The main use of the coils in the case of small animals and birds is apparently partly to hinder their struggling, and partly to push the carcase into the proper position for swallowing, and to assist the deglutition by pressing the food against the other coils and the ground. It is only when the prey has almost disappeared down its throat that the snake straightens itself out. The Chinese eat the flesh of the Python, and the fat, of which there is usually a good deal, is a popular native medicine. In colour the python varies somewhat, young and half-grown specimens being often almost golden yellow. I have also seen a very dark, almost black variety.

P. molurus, the Indian python, is recorded from the peninsula, but I have not seen it.

P. curtus, the little red python, formerly considered very rare, does not seem to be so in the peninsula. It is quite small for a python, only 8 or 9 feet long usually. It is a quiet snake in captivity and seems chiefly to feed on rats.

The little burrowing snakes, *Typhlops*, are to be found in rotten cocoanut palms, and other trees, in the sawdust of the saw mills, and in the ground. A great number of kinds have been described, but they are very difficult to identify. Our commonest species is *Typhlops braminus*. It is usually about four inches long, and very slender, with a very small head, and minute eyes, and a sharp-pointed tail. Its colour is lavender grey, or black, and it is very active, wriggling like a worm when disturbed.

Cylindrophus rufus is another burrowing snake, but is much larger, about a foot long. It is black, with white bands beneath, some red on its neck, and a bright red tip to its tail. It is short and thick, and has an odd habit of flattening itself out, and turning up the tip of its tail. It is common in gardens, burrowing in the ground.

Chersydrus granulatus Schn. is a short thick blunt-nosed snake, alternately banded with dirty brown and white. It seems to be rare here, only two specimens being recorded from the peninsula, in Flower's list. One was recently brought to me which had been found in the road near the gardens. As it is an aquatic snake which lives on fish, it is probable that it was attempting to cross from some ditch which had dried up from the very hot weather, in order to find another wet spot.

There are many very pretty harmless tree-snakes, slender long-tailed reptiles, often gaily coloured. They usually creep about in bushes at no great height from the ground, moving very briskly when disturbed. Such are the snakes of the genera *Dendrophis*, *Dendrelaphis* and *Dryophis*.

Dendrelaphis caudolineatus is a very common kind, brown with a bright yellow band down its side. It seems more or less gregarious, as I have seen three in one bush. When annoyed I have noticed it emits an appalling odour of carrion.

The little snakes of the genera *Ablabes* and *Simotes*, though allied to *Dendrelaphis*, are generally to be met with creeping on the ground, or concealed beneath logs or stones. They never seem to climb into trees, and being terrestrial are usually dull brown, sometimes marked with red. *Simotes purpurascens*, which I got from the Bukit Timah road, was dark brown with large distant red spots and a bright red belly. *S. signatus* I found under a pile of tiles in the garden. It was also dull brown. *S. octolineatus*, which is perhaps the commonest kind, is a bigger and gayer-coloured animal, brown or yellow with eight black lines running its whole length, a red bar down its back and a red belly.

A very interesting and common snake is *Macropisthodon rhodomelas*, a slender terracotta red snake, usually about a foot long, with a curious bluish triangle on its neck in a black V, and a black line down its back. It is often to be seen gliding through the grass or across paths in the day time. Its peculiarity is its means of defence. When vexed, it sits up after the manner of a cobra, and seems to flatten out its neck as if it was trying to imitate that species, while from the bluish patch on its neck are exuded some drops of a white viscid liquid representing the well-known cobra marks. I noticed that my dog, seizing this

snake in its mouth to worry it, presently foamed at the mouth, as if he had been licking a toad, and soon dropped the snake. I tasted the exudation, and found it bitter, but it had no effect on my salivary glands. It is evident, however, that it must act as a deterrent on its enemies, and perhaps the cobra-like habit of sitting up may also alarm an animal about to attack it, but I must admit the actual resemblance to a cobra is not really very great. This snake possesses two very long glassy fangs at the back of its mouth, which might lead persons to suppose that it is venomous, but the poison fangs of a dangerous snake are in the front of the mouth, and *Macropisthodon*, though it can bite sharply, is not poisonous.

There are a good many snakes of the type usually popularly known as Rat-snakes, and Water-snakes, several of which attain a considerable size, seven or eight feet long. The black ones such as *Coluber melanurus*, which I have found under a pile of rotten boards, are often mistaken for cobras and promptly slain, whereas as rat-killers they might be encouraged. *C. taeniurus*, the cave snake, which I described in the last number of the Journal, has been recently caught by Mr. Rostados at Kota Tinggi, in Johore, far away from any caves or rocks, and this specimen is certainly more of the olivaceous colour described by Boulenger, and not so white as that of the caves.

Dipsadomorphus dendrophilus is a common and very beautiful harmless snake of considerable size. It usually lives in mangrove swamps, where it sits coiled up on the branches waiting for birds or rats. Its colouring is an intense glossy black with bright yellow bands, and in this it resembles the deadly *Bungarus fasciatus*, also a mangrove-haunting snake, but whether this can be classed as a genuine case of mimicry or is only an accidental resemblance it would be hard to say. It is a very quiet snake, and becomes quite tame very shortly after capture. One captured on the Sirangoon river, where it is very abundant, laid four rather large oblong white eggs, soon after it was caught The Malays call it Ular ranke or Ular chin-chin mas.

D. cynodon is another common species, about five feet in length. There are two colour forms of this, which look so different that one would hardly recognize them as the same. In one the body is bright brown with darker blotches and a yellow

throat. I caught a fine one on Gunong Keledang in Perak, among thick fern. The other form is almost black with a few yellow marks, about its head. One was brought me by a small Malay boy from Tanglin village, where he declared it had been killing the fowls.

Zaocys carinata is a large harmless snake, of which I caught a very fine specimen, about eight feet long, after a considerable chase. It was almost completely black, but there are also light-coloured varieties. It moves very rapidly, and I could hardly keep up with it though I was running on the path and it was gliding through the scrub. The Malays called it Ular Tedong, but this name is applied apparently to a variety of snakes.

The green tree-snake, *Dryophis prasinus*, the Ular Daun of the Malays, is another of our very common snakes. Usually of a bright apple-green, with its long slender whip, like body and its pointed snout, it is easily recognised. It is readily tamed, though when fresh caught it is apt to be snappish. There are two or three colour varieties, the commonest of which next to the green one is light brown, but I have also seen a form banded alternately grey and white. It feeds chiefly I believe on frogs and lizards. I found one on an occasion trying to swallow a Calotes in spite of the thorny spikes on its back. The Malays say that if you take the fat of this snake and make a lamp with it and a floating wick, on lighting this in the evening, the whole room or house becomes full of these green snakes, and this diversion is sometimes employed on festal occasions. My informant told me that he had seen this done with perfect success.

No less than thirty-one poisonous snakes are recorded from the Peninsula, but nearly half of these are sea snakes. Very little is known as to the habits of these latter. They are generally taken out of the fishing stakes, where they doubtless go in pursuit of the fish, on which they live.

Bungarus fasciatus has already been alluded to. It is a fairly large powerful snake, of a black colour with yellow bands. It is almost always found near the sea, in tidal waters. In captivity it is vicious and ill-tempered, striking about freely and furiously rattling its tail.

The Cobra is well-known to residents, being quite a common garden snake. The specimens met with in the south of the

peninsula are nearly always inky black, further north they are brown. I have never seen a brown one in Singapore, nor a black one in Penang or Province Wellesley. They appear to be much smaller than the Indian form, a specimen over five feet long being unusual. When annoyed the Cobra sits up in the well-known manner, and makes a very curious snorting noise, holding its mouth open in the form of a circle, and every now and then spitting its saliva at its opponent, whence its name *Naia sputatrix*. It never attempts to bite, but spits with great accuracy. One struck me all over the face at a distance of eight feet, and a student of snakes, who was not aware of this habit in our local variety, was struck in the eye by one he was examining; the saliva, which produces only a slight irritation of the skin of the face, causing some amount of inflammation in the eye, which did not subside for some hours. I have also seen a dog struck in the eye by the saliva, while attacking a cobra, much to his discomfiture. When cornered and defending himself, the cobra is very quick in turning the raised part of the body, which it throws forward for a considerable distance, to deter its enemy, but if left alone, glides away as quickly as it can, taking refuge under a log, or in a hole. It is nocturnal in its habits, remaining in its hole all day, unless disturbed. It generally feeds on mice and toads, but I once found one eating a small snake (*Macropisthodon*). In captivity it is quiet, and usually gentle.

The Hamadryad (*Naia bungarus* or *Ophiophagus elaps*), though not an exceedingly common snake, is probably better known by reputation to residents than any other. It is the biggest of all our poisonous snakes, attaining a length of 13 feet, and is proportionately stout. In colour it is usually a pale brown, without any markings, and as it does not sit up so often as the cobra does, when in danger, and the large poison glands, so conspicuous in many venomous snakes, are not very clearly visible, it is often mistaken for a harmless snake. Its plain brown colour, the large plates on its blunt head, and when irritated, its erect attitude and expanded hood easily distinguish it. It is commonly reported to be very aggressive and to pursue people who irritate it. I have never seen this myself, and it certainly requires further proof. As is well known, it feeds, generally at least, on other snakes, and I have caught one in the act of swallowing a small

python. Although the Indian Hamadryad is easily kept in confinement in England, I have never been able to keep one very long here. It refuses all food, not only its natural food of snakes, but also eggs and milk, which almost every other snake will lick up. The Hamadryad is less common in Singapore now than formerly, I believe, but is occasionally taken. Four or five have been taken in the gardens within the past six or seven years, one about eight feet in length having been caught here last September, but it is fairly abundant in other parts of the peninsula.

The beautiful scarlet and blue *Doliophis bivirgatus* is not common in Singapore. I have only once seen it here, but it is plentiful in the hill woods, where it may be seen basking in the sun on the paths. It occurs in Penang, Malacca, Province Wellesley, Selangor, the Bindings and Kedah, as well as Singapore.

Of the Vipers, by far the commonest is *Lachesis Wagleri*, a vicious looking, but handsome snake, mottled with green, dark blue, yellow and black. Its large flat head, shaped like the ace of spades, and narrow yellow eyes, give it a wicked appearance. It is generally about two feet and a half in length when full grown, and is thick in proportion to its length. It is an arboreal snake, sitting very quietly upon the boughs of trees or bushes, where it catches rats and birds. Young specimens are often plain dull green with a few distant reddish spots, and do not at all resemble the common form. I have seen a female viper opened which contained several young ones, of which all but one were coloured like the adult, while the remaining one was of the plain green form. It occurs all over the peninsula. When annoyed it opens its mouth exceedingly wide, showing its poison fangs, but it is very slow and stupid, creeping away in a leisurely manner. It has a great reputation as a very deadly snake, which I have reason to believe is hardly justified. I have seen one strike a java sparrow on the thigh, producing a considerable flow of blood. The sparrow flew to the end of the cage but showed no signs of poisoning, and remained quite lively till the snake pursued it again and caught it by the head and killed it. A cooly stepped on a young green viper about a foot long, which bit him on the toe. I was not informed of this for over an hour, when I went to see him and found his leg a good deal swollen and he was suffering a good deal of pain, but after rubbing his leg and

treating the bite with permanganate of potash, he very soon got better and was well in a couple of hours. In fact the bite was no worse than that of a centipede. A good sized pariah dog was bitten on the thigh by a full grown and large sized green viper. The wound bled a good deal, and the dog uttered a cry and ran off, but in an hour or two it reappeared none the worse. I have also seen two cases in which coolies stated they had been bitten by green vipers, and in one certainly saw the snake (also a young one), which was said to have bitten the man, but in neither case were there any of the serious symptoms of snake bite; and as the green viper when it bites holds on tight for some time, and does not merely strike without closing his mouth as the cobra does, it must inject a good quantity of the saliva into the wound; wherefore I conclude the animal is not as deadly as it is reputed to be. Fayrer in "Thanatophidia" in writing of *L. gramineus* quotes from Russell and Blyth, both of whom had seen cases of men bitten by green vipers who merely suffered from pain and swelling and recovered, and Russell, experimenting with the poison of this species, found that it killed birds, but that pigs and dogs recovered, so that it may be doubted that any of these vipers are truly deadly. *L. Wagleri* lives very well in captivity, and is quite gentle and very sluggish. Young animals live chiefly on geckos, the bigger ones eat rats and birds, and it is surprising what large rats they will eat. I have given one a large dead rat with its arms stretched stiffly out and quite rigid, but the viper managed to swallow it quite easily getting the sides of its mouth round the projecting arms most skilfully.

The other green coloured viper *(Lachesis gramineus)* of a plain green colour with a reddish tip to its tail, was apparently much more common in Singapore formerly than it is now, for while looking over the collection of serpents in the British Museum I noticed that there were many specimens of this snake, all from early collectors, and very few *L. Wagleri*. Now, however, *L. gramineus* is quite rare. I have only met with one or two, while *L. Wagleri* is, as I have said, very common.

The purple viper *L. purpureo-maculatus*, not a very plentiful snake, seems always to reside on the sea-shore, hiding under rocks or basking in the sun. It is of a very deep purple brown colour, nearly black. I have caught it on the shore at Toas, and

seen it from Blakang Mati.

Two other vipers, *L. sumatranus* and *L. monticola*, are also reported from Singapore and Penang, but they appear to be very rare here.

There can be no doubt that snakes are much scarcer in Singapore than formerly, and this is no doubt due to clearing of much of the jungle, and especially the constant burning of the Lalang, but still a great variety remain here, and some kinds are still remarkably abundant, and those by no means always of the smaller kinds.

It is rather interesting to observe the behaviour of various animals at the sight of snakes. Common monkeys are usually very excited, crowding together to look at it, and chattering loudly. The Mias, who usually inhabits trees taller than snakes are accustomed to ascend, seems to take no notice of one. The binturong, on bringing a cobra near it, turned its face away as if in horror, but really no doubt recognizing that its most vulnerable portion was its face The Water Mungoose, *Herpestes brachyurus*, like the Indian Mungoose, bristles up its fur and attacks and devours the snake. Some deer, when a large python was brought past their paddock, though at some distance, crowded together at the bars, gazing at it and stamping their feet, evidently recognizing it as a dangerous enemy.

I append a list of our reptiles as far as at present known, based on Mr. Flower's list already referred to, with the addition of later captures and have added all recorded localities. Those marked (!) I have collected myself or have seen in the Singapore Museum. It will be seen how little we know of the fauna of the Native States as yet.

List of Reptiles.

Chelonia.

Dermochelys coriacea Boul. Singapore !
Callagur picta Gray. Penang, Singapore !
Batagur baska Gray. Penang.
Kachuga lineata Gray. Legeh !
Bellia crassicollis Gray. Penang !
Cyclemys platynota Gray. Singapore !
C. amboinensis Daud. Singapore ! Malacca !
Geomyda spinosa Gray. Singapore ! Penang, Dindings ! Legeh !
G. grandis Singapore ! Selangor !
Testudo emys Schl. Penang, Dindings ! Perak.
Chelone mydas L. Dindings ! Kedah !
Ch. imbricata L. Singapore ?
Thalassochelys caretta L. Singapore ! Johore !
Trionyx subplanus Geoff. Singapore, Penang.
Tr. hurum Gray. Penang, Legeh !
Tr. Phayrei Theob. Penang.
Tr. cartilagineus Bodd. Singapore ! Penang.
Pelochelys cantoris Gray. Penang.

Crocodilidae.

Tomistoma schlegeli S. Müll. Perak, Pahang.
Crocodilus porosus Schn. Singapore ! Johore, Penang, Province Wellesley ! Perak ! Selangor ! Kedah, Dindings !
C. porosus Less. Singapore ? Selangor.

Lacertilidae.

Gymnodactylus affinis Stol. Penang.
G. pulchellus Gray. Penang ! Perak !
Gonatodes Kendalli Gray. Singapore ! Perak.
G. affinis Stol. Penang.

Aeluroscalabotes felinus Gthr. Singapore.
Hemidactylus frenatus D. & B. Singapore, Penang ! Perak !
H. Gleadovii Murr. Singapore.
H. depressus Gray. Singapore.
H. Leschenaultii D. & B. Penang.
H. Coctæi D. & B. Penang.
H. platyurus Schn. Penang, Singapore !
Mimetozoon Floweri Blgr. Penang.
Gehyra mutilata Wiegn. Singapore ! Penang ! Perak !
Lepidodactylus ceylonensis Blgr. Singapore.
L. lugubris D. & B. Penang.
Gecko verticillatus Lawr. Singapore, Penang.
G. stentor Cantor Penang
G. Monarchus D. & B. Singapore ! Penang, Malacca !
Ptychozoon homalocephalum Grey. Penang, Singapore !
P. horsfieldi Gray Singapore, Penang.
Draco volans L. Singapore ! Penang, Malacca, Dindings ! Kedah !
D. maculatus Gray Penang.
D. fimbriatus Kuhl. Singapore, Penang.
D. quinquefasciatus Gray. Penang, Selangor !
D. melanopogon Blgr. Malacca, Singapore !
Aphaniotis fusca Ptrs. Malacca.
Gonyocephalus Herveyi Blgr. Malacca.
G. borneensis Schl. Malacca, Perak !
G. grandis Gray. Penang.
Acanthosaura armata Gray. Singapore, Penang.
Calotes cristatellus Kuhl. Singapore, Penang, Selangor, Kemaman !
C. versicolor Daud. Singapore, Penang, Kedah, Province Wellesley !
Liolepis bellii Gray. Malacca ! Pahang ! Dindings ! Penang, Province Wellesley.
Varanus flavescens Gray. Penang.
V. nebulosus Gray. Penang, Malacca, Singapore !
V. rudicollis Gray. Malacca.
V. salvator Laur. Singapore ! Penang, Kedah, Pahang ! Dindings ! Malacca !
Mabuia novemcarinata And. Penang.
M. multifasciata Kuhl. Singapore ! Penang.
Lygosoma anomalopus Blgr. Penang.

Lygosoma olivaceum Gray Singapore! Penang.
L. singaporense Singapore.
L. jerdonianum Stol. Penang.
L. Bowringii Gthr. Singapore.
L. albopunctatum Gray. Singapore, Penang.
L. chalcides L. Singapore, Penang.

OPHIDIA.

Typhlops lineatus Boie. Singapore, Penang, Malacca.
T. braminus Daud. Singapore! Penang.
T. bothriorhynchus Gunther. Penang.
T. nigro-albus D. & B. Singapore, Perak, Penang.
Python reticulatus Schn. Singapore! Penang, Perak! Selangor!
P. molurus L. Province Wellesley?
P. curtus Schl. Singapore! Malacca, Selangor?
Cylindrophus rufus Lawr. Singapore! Penang.
C. lineatus Blanf. Singapore!
Xenopeltis unicolor Reinh Singapore! Penang!
Acrochordus javanicus Hornst. Singapore, Penang, Pahang.
Chersydrus granulatus Schn. Singapore! Penang.
Xenodermus javanicus Reinh. Penang?
Polyodontophis geminatus Boie. Singapore, Malacca.
P. sagittarius Cant. ?
Xenochropis cerasogaster Cant. Province Wellesley.
Tropidonotus trianguligerus Boie. Singapore! Penang.
T. piscator Schn. Singapore, Penang!
T. stolatus L. Singapore.
T. vittatus L. Penang.
T. chrysargus Perak!
T. subminiatus Schl. Penang, Perak.
T. maculatus Edel. Malacca.
Macropisthodon flariceps D. & B. Perak.
M. rhodomelas Boie. Singapore! Pahang!
Helicops schistosus Daud. ?
Lycodon aulicus L. Singapore! Penang.
L. effrenis Cant. Penang.
L. subcinctus Boie Singapore! Penang, Kemaman!
Dryocalamus subannulatus D. Singapore! Province Wellesley.
Zaocys carinatus Gthr. Singapore! Perak.

Zamenis korros Schl. Singapore, Penang, Perak.
Z. mucosus L. Singapore.
Z. fasciolatus Shaw. Province Wellesley.
Xenelaphis hexagonotus Cant. Singapore! Penang, Pahang!
Coluber porphyraceus Cant. Singapore.
C. oxycephalus Boie. Singapore, Penang, Pahang!
C. tæniurus Johore! Selangor!
C. melanurus Schl. Singapore! Province Wellesley, Penang.
C. radiatus Schl. Singapore! Penang.
C. Hodgsoni Singapore!
Gonyophis margaritatus Ptrs. Singapore.
Dendrophis pictus Boie. Singapore, Perak, Kedah, Selangor!
D. formosus Boie. Singapore! Province Wellesley, Selangor!
Dendrelaphis caudolineatus Gray. Singapore! Pahang! Penang Perak.
Macrocalamus lateralis Perak.
Simotes purpurascens Schl. Singapore! Johore, Penang.
S. cyclurus Cant. Penang, Singapore!
S. octolineatus Schn. Singapore! Perak.
S. signatus Gthr. Singapore!
S. cruentatus Gthr. Penang.
Ablabes tricolor Schl. Singapore!
A. baliodeirus Boie. Penang, Province Wellesley, Perak, Bujong Malacca!
A. longicauda Ptrs. Penang.
Pseudorhabdium longiceps Cantor. Singapore, Penang, Perak.
Calamaria albiventer Gray Penang.
C. sumatrana Edel. Singapore.
C. leucocephala D. & B. Singapore, Penang!
C. pavimentata D. & B. Penang! Province Wellesley.
Hypsirhina plumbea Boie. Penang.
H. enhydris Schn. Singapore, Penang.
H. Sieboldii Schl. Province Wellesley.
Homalopsis buccata L. Singapore! Malacca, Penang.
Cerberus rhynchops Schn. Singapore! Penang, Selangor!
Fordonia leucobalia Schl. Singapore! Penang.
Cantoria violacea Gir. Singapore!
Hipistes hydrinus Cant. Singapore, Penang, Kedah.
Dipsadomorphus multimaculatus Boie. Penang.

D. Gokool Gray. Penang.
D. dendrophilus Boie. Singapore, Penang, Kedah, Din lings, Perak!
D. jaspideus D. and B. Penang.
D. Drapiezii Boie. Singapore! Malacca.
D. cynodon Boie. Singapore! Province Wellesley, Malacca, Perak! (Gunong Keledang).
Psammodynastes pulverulentus Boie. Penang, Perak.
Eryophis xanthozona Boie. Penang.
D. prasinus Boie. Singapore! Penang, Pahang!
D. rubescens Gray. Penang.
Chrysopelea ornata Shaw. Singapore! Penang! Kedah, Jelebu!
D. chrysochlora Reinw. Singapore! Penang.
Hydrus platurus L. Singapore! Province Wellesley.
Hydrophis cerulescens Shaw Penang.
H. Cantoris Gthr. Penang.
H. fasciatus Schn. Penang.
H. torquatus Gthr. ?
Distira Stokesii Gray Singapore!
D. Brugmansii Boie. Penang.
D. cyanocincta Daud. Singapore.
D. Jerdonii Gray Penang.
Enhydris Hardwickii Gray Singapore.
Enhydrina Valakadien. Boie. Penang.
Aipysurus Eydouxi Gray. Singapore.
Platurus colubrinus Schn. Singapore! Penang.
Bungarus fasciatus Schn. Singapore! Penang, Province Wellesley, Pahang! Malacca!
B. candidus L. Kedah, Penang.
B. flaviceps Reinh. Penang, Province Wellesley.
Naia tripudians Merr. Singapore! Penang, Province Wellesley; Kedah.
N. bungarus Schl. Singapore! Penang, Province Wellesley, Pahang! Selangor! Perak.
Callophis gracilis Gray. Singapore, Penang.
C. maculiceps Gthr. Province Wellesley.
Doliophis bivirgatus Boie. Singapore! Malacca, Din lings! Penang, Selangor! Province Wellesley, Kedah.
D. intestinalis Laur. Singapore, Penang, Malacca, Province Wellesley, Pahang!

Haplopeltura Boa Boie. Penang.
Amblycephalus laevis Boie. Malacca ?
A. malaccanus Ptrs. Malacca.
Lachesis monticola Gthr. Singapore, Penang.
L. purpureomaculatus Gray. Singapore ! Penang.
L. gramineus Shaw. Singapore ! Penang.
L. sumatranus Raffles. Singapore.
L. Wagleri Boie. Singapore ! Penang, Malacca, Perak ! Selangor ! Pahang !

Notes.

The name "Malayu."

The national name of the Malays is mentioned, if not for the first time in recorded history, at any rate with a distinct territorial denotation, as early as the 7th century of our era by I Tsing, a Chinese Buddhist pilgrim, in two of his works, the *Ta-t'ang-si-yu-Ku-fa-Kao-sêng-ch'uan* or "Memoirs of Eminent Priests who visited India and Neighbouring Countries to search for the Law under the Great T'ang Dynasty," and the "Record of the Buddhist Religion as practised in India and the Malay Archipelago."

This latter work, the original title of which is *Nan-hai-chi-Kuei-nai-fa-ch'uan*, literally "The Record of the Sacred Law, sent home from the Southern Sea," has been translated, together with part of the former, into English, by J. Takakusu, a Japanese scholar, and was published in 1896 by the Oxford Clarendon Press. The author, who visited the Malay Archipelago in the winter of A. D. 671-2 and remained for some time in Sumatra, speaks of the *Mo-lo-yu* country as being one of the islands of the South Sea in which Buddhism then prevailed. He fixes its position by telling us that it lay to the west of *Shih-li-fo-shih* (Sri Bhoja or Bhoja), which place appears to be certainly identified with the *San-bo-tsai* of other Chinese chroniclers and the *Sarbaza* of the Arabian geographers of the 9th century. I Tsing tells us that Sri Bhoja had, in his time or shortly before his visit, annexed the *Mo-lo-yu* country.

Sri Bhoja was at this time a great centre of Buddhism, and I Tsing's object in visiting it was to study the sacred Canon and the Sanskrit language. After a stay of six months, he went on to the *Mo-lo-yu* country and then to India, but about A. D. 688 he returned to Sri Bhoja, and remained there about six years, so that he had ample opportunity for becoming acquainted with the circumstances of the coutry. From other sources* this

* See especially Groeneveldt's "Notes on the Malay Archipelago," etc., Essays on Indo-China, etc. 2nd series, vol. 1.

place Sri Bhoja, *San-bo-tsai*, *Sarbaza*, etc., as it is variously called, has been identified with almost absolute certainty as being situated on the Palembang river in South-eastern Sumatra; and the *Mo-lo-yu* country can therefore be confidently regarded as placed immediately to the west or north-west, that is to say about the middle of Sumatra. I Tsing, who stayed in the *Mo-lo-yu* country for two months on his way to India, says that it was fifteen days' sail from Bhoja, the capital of Sri Bhoja; and it must have been situated approximately under the Equator, for in the middle of the eighth month and in the middle of spring the sun cast no shadow there at noon. Moreover it was half-way on the route between Bhoja and *Ka-cha* (a place in or near Achin or Kedah, more probably the former, as it was south of the country of the Naked People, *i e.*, the Nicobar and Andaman islands). From *Ka-cha* ships sailed in thirty days to *Nagapatana* (Negapatam), and I Tsing himself took ship there for *Tamralipti* (Tamluk), a port near the mouth of the Hooghly.

It seems therefore that the *Mo-lo-yu* country was not at this time a purely inland State, but had a coast line on the Straits more or less opposite to where Malacca now stands.

The language of the *Mo-lo-yu* country was that which served as a *lingua franca* in the Archipelago generally, and was known to I Tsing and other Chinese authors as the K'un-lun language. This term was derived, apparently, from the Chinese name of Pulau Condor, on the same principle on which slaves from these regions are often mentioned in Chinese chronicles as *K'un-lun* slaves, from whatever part of the Archipelago they might have actually been imported. The reason seems to have been that the Pulau Condor people were the first of the Southern islanders to come into contact with the Chinese, who afterwards loosely extended the term to the inhabitants of the Archipelago generally. This appears to be the meaning of the explanation I Tsing gives when, speaking of the Archipelago as a whole and after enumerating some of the principal islands, he goes on to say, "They were generally known by the general name of 'Country of K'un-lun' since (the people of) K'un-lun first visited Kochin and Kwangtung."

That the language was really Malay appears from the fact that the "*pin-lang* fruit" is mentioned by I Tsing as being used

in the Sri Bhoja country and other islands of the Archipelago for chewing with nutmegs, cloves and Barus camphor, for the purpose of rendering the mouth fragrant. *Pin-lang* is of course the Malay word *pinang*, areca nut.

In I Tsing's time, it seems therefore that the Malay country *par excellence* was in Central Sumatra, a fact agreeing very well with native Malay tradition on the subject, which derives the origin of many of the Malays of the Peninsula from the old Central Sumatran State of Menangkabau.

The etymological signification of the national name *Malayu* has been a subject of much dispute. I Tsing does not throw any additional light upon it; but he makes it quite clear that the word had in his time a local significance, and denoted the particular region from which a large part of the Malays of the modern *Tanah Malayu* love to trace their origin.

C. O. Blagden.

The Putri Gunong Ledang.

(Fairy Princess of Mt. Ophir.)

The following extract from an essay written by a Malacca Chinese boy may be of interest to readers of the Journal of the Straits Branch of the Royal Asiatic Society. I give the boy's own words.

The aborigines of Malacca used to believe that Mt. Ophir was a sacred mountain. Mt. Ophir is also believed to be so by the Malays, as well as by most of the Strait-born Chinese. Since many years ago, neither Malays nor Chinese have ever reached the top of the mountain, where, as our ancestors say, there is plenty of gold strewn along the floor. Although some of the Europeans have been there, yet the natives have not believed it. It is said that there is a fairy who takes charge of the sacred mountain. In the morning, as the sun rises, the fairy is a beautiful girl playing near her well-built hut. At noon, as the sun is right over our head, the girl changes into a maiden; and in the evening, as the sun sets, the maiden becomes an old woman. The same thing happens every day.

There is also a sacred tiger possessed by the fairy as her sole guardian of the mountain. It always sits half-way down the mountain. As most of the uneducated are superstitious, they believe that there is also a kind of plant grown near the house of the fairy, and any one who gets a leaf from that plant and eats it, besides being always young and beautiful, will never die. Many of the ancient people of Malacca attempted to get some of the leaves, and many lost their lives in the attempts because of their absurdity.

This story was first told by a Malay who accidentally reached the top of the mountain. One day while cutting wood with some of his companions he was accidentally separated from them and was left alone in the forests. What was his alarm when he saw a tiger; and being unable to get rid of the wild beast, he fell on the ground and fainted. He was carried to the fairy, and being a worshipper, as people were in those days, he was well treated. He stayed there for several hours, and was told to pick some of the largest lumps of saffron and take them home. While he was walking the bag became heavier, and he then threw some of the lumps away. When he reached home he found that the saffron turned into gold. This is the story which the Malays as well as the Straits Chinese believe about Mt. Ophir or Gunong Leydang."

R. J. Wilkinson.

Golden Flowers.

There was living in Singapore not many years ago a Chinaman in very poor circumstances, who possessed, however, a small garden, in which grew a plant of the Pandan Wangi (*Pandanus laeris*), a tree which is often cultivated for its scented leaves used for flavouring rice and for making a kind of *pot pourri* used at weddings. He supplied the tree liberally with manure, and one moonlight night he was surprised to see it bearing a red flower. Going to examine it next day, no flower was to be seen, but next night it was there again, and he climbed up and got it, and put it on a table in his house. On the

following morning he found it was changed into gold, and broke off a bit and took it off to sell. On returning, he found the bit he had broken off had grown again, and this continued till he became a very rich man. On his death the flower disappeared, and the family became comparatively poor again. The Pandan Wangi very rarely flowers (indeed I have never seen the flowers of it), and the male flowers are white and sweet-scented, like those of any other Pandanus.

Recently a Javanese who was in the Botanic gardens on a moonlight evening perceived on the stem of a wild fig-tree (*Ficus Miquelii*) at a height of about ten feet from the ground, a red flower about as big as a large marigold. Not knowing the peculiarity of the Gold flower, he went to call a companion to look at it, when it immediately vanished, nor has it reappeared. It seems that the gold flower objects to a crowd, and will only be visible to certain fortunate persons, and this cooly, by calling a companion to see it and not immediately seizing the flower, has missed his opportunity of becoming a wealthy man. It is hardly necessary to say that the flowers of the fig are enclosed in the fig itself, which is mistaken for the fruit by the natives, who imagine that fig-trees have no flowers at all but only fruits. And thus, as, like the Pandan, it has normally no flowers, it is just the kind of tree you would expect to find gold flowers on.

H. N. R.

Remarks on the Rhinoceros Hornbill (Buceros Rhinoceros),

and some other species mentioned in Mr. Ridley's Paper on the Birds of the Botanical Gardens.

Writing of the Rhinoceros Hornbill in his interesting paper on Singapore Birds, Mr. Ridley says, "The beak and casque are naturally white, but during life are coloured orange and red. This is done by the bird itself, which every morning rubs its beak against a gland beneath its tail, whence exudes an orange-red liquid which colours the beak."

The gland (uropygial) is *above* and not *below* the tail; below is of course a *lapsus calami*. In a letter to Mr. Ridley I told him that I thought the red colour on the bill, thoug

fugitive, was natural to it, and not, like the yellow, put on by the bird. Mr. Ridley considered that both colours came from the oil-gland; so to settle the question I made a careful examination of the white, bleached beak of an old mounted specimen. The bill consists of a cellular bony core of extreme lightness encased in a thin covering of horn; the casque is entirely hollow, except for a mass of bony cells at the base. The horn of the outer covering is in thin flaky layers, and it is only the outer one of these which entirely loses colour in a stuffed specimen. If it be removed, the red colour is seen to be retained, though less vivid than in life, throughout the remaining layers of the horny casing. It appears, therefore, that either the outer layer of horn is naturally red and bleaches on the death of the bird, or that it is transparent when daily anointed with the uropygial oil, allowing the underlying red colour to show through, but becoming opaque in the dried specimen.

Probably the oiling of the bill, which is common to both sexes, is as much to keep the surface from cracking or becoming brittle and flaky as for decorative purposes.

Ægithina tiphia, Mr. Ridley describes as resembling a goldfinch in its plumage and habits. The resemblance in habits is not very apparent. Goldfinches are gregarious, frequent open country, and feed on seeds, principally on thistle-down; the Iora goes in pairs or singly, keeps chiefly to secondary jungle or low trees, and feeds on insects, mainly caterpillars.

Turnix plumbipes. Describing the decoying of these quail, Mr. Ridley says, "A cock quail is put inside the cage." Surely, a *hen*? It is the hens that do the courting and the fighting in the genus Turnix. They are also the larger and most conspicuously coloured birds. I have seen numbers trapped in India and Ceylon with hen decoys, but never saw a cock used.

Gallinago Sthenura. The name Mr. Ridley uses arose from a misprint. "Stenura" is correct, and has been shown to be what Bonaparte originally wrote, referring (*stenos*, narrow) to the attenuated lateral tail feathers. But this is merely a matter of synonymy, the least interesting part of ornithology.

A. L. Butler,

NOTE. Mr. Butler's remarks are very interesting, and speak for themselves, so I need only refer to the fighting quails. Since hearing from him, I have met several quail-catchers in Sungei Ujong, and examining the decoy birds find that all were females. The Malays too told me they always used the females for fighting, and the males did not fight.

H. N. R.

Bekin.

Regarding the Malay word "bikin" = to do, to make, etc., —the use of which is so strongly deprecated, and the bastard origin of which is insisted upon by all authorities on the language—has the probability of its Persian origin ever been seriously considered? The word bears a striking resemblance to "bikun," the imperative of the common Persian verb "to do, to make," etc. If this origin could be established it would raise the word from its present obloquious position to one of quite classical respectability.

W. C.

An insectivorous squirrel.

The swarming of a nest of termites is always interesting to watch on account of the numerous enemies which hasten to the spot to prey upon these helpless insects. Birds, chiefly bulbuls, robins, drongos and bee-eaters, are the usual assailants. Dragon-flies also dart to and fro through the swarm, and frogs and toads hasten from their retreats to devour those that fall on the ground. I was surprised, however, recently on one of these occasions to see a little squirrel (*Nanosciurus exilis*) creeping about on the ground and eagerly catching the insects. On my remaining quite motionless, it crept out of the bushes upon the road where it remained about two feet from me intent on its prey, which it ate wings and all, apparently with much enjoyment, and by the rustling in the bushes I judged there was at least one more, which I could not see, attacking the swarm.

H. N. R.

Notes from Sarawak Museum.

On a Fossil Tooth found at Bau, Upper Sarawak.

A molar tooth of the Indian elephant (*Elephas indicus*) was recently found in a small cave at Bau, Upper Sarawak, by a Chinaman, whilst washing for gold, and was handed over to me by Mr. Pawle of the Borneo Company, whose kindness in so doing, I beg to acknowledge here. The tooth is an undoubted fossil, as shown by a longitudinal section subsequently made, but since it was lying in a crevice in the limestone, not actually imbedded in rock, it is impossible to state with any degree of accuracy the exact horizon of the specimen. The limestone in this part of Sarawak is undoubtedly of comparatively recent origin, as shown by fossils collected by me; such characteristic shells as Cerithium and Limopsis being here abundant; the formation is honeycombed with caves, many of which were carefully explored in 1878-9 by the late Mr. A. H. Everett. His results were embodied in a report to the Royal Society (Proc. Roy. Soc. No. 203, 1880) and he there states it as his opinion, that it is unlikely that deposits of any great antiquity or interest will be found in this area; subsequent observations have justified and will, I think, continue to justify these words; the fossil tooth, the subject of this note, is interesting only because it proves conclusively that which formerly was argued inductively, *viz*:— that the Indian elephant was once an indigenous inhabitant of Borneo. In Mr. C. Hose's "Mammals of Borneo," *Elephas indicus* is included as an indigenous species; but there is little doubt that the few individuals now existing in North Borneo have sprung from some pairs which were introduced some years ago, certainly within the memory of living man. These pairs were presented by a Sultan of Pahang to the Sultan of Brunei or Sulu (for on this point accounts differ), and after they had been kept in semi-captivity for a year or two, were turned loose into the jungle. Considering the low rate of breeding of elephants it is not surprising that their present distribution in the island of Borneo is so extremely local. It is also worthy of note that the Kyans at the head of the Rejang and Baram rivers, areas in which the rhinoceros and wild buffalo

occur, are not only ignorant of the existence of the elephant both by personal observation or by hearsay, but have no word in their language for that animal. Fossil remains of various species of elephants have been found in the Pliocene and Pleistocene deposits of many countries, but *Elephas indicus* itself has not been shewn to have any great antiquity, nor do I attempt to shew it now from the fragment before me. Borneo was separated from the Asiatic continent in quite recent times, and it is not impossible that the elephant lingered on in the newly-formed island for some length of time. That the species was once indigenous to Borneo is proved now for the first time and beyond all manner of doubt.

R. S. Shelford.

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[No. 33].

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THE
STRAITS BRANCH
OF THE
ROYAL ASIATIC SOCIETY.

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1900.

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WRAY, L., JR.	Taipeng, Perak.

Members are requested to inform the Secretary of any change of address or decease of members, in order that the list may be as complete as possible.

All communications concerning the publications of the Society should be addressed to the Secretary: all subscriptions to the Treasurer.

Members may have, on application, forms authorising their Bankers or Agents to pay their subscriptions to the Society regularly each year.

PROCEEDINGS

OF THE

ANNUAL GENERAL MEETING

OF THE

STRAITS BRANCH

ROYAL ASIATIC SOCIETY,

HELD AT THE

RAFFLES MUSEUM, SINGAPORE,

ON

29th JANUARY, 1900.

———:———

PRESENT:

Right Reverend BISHOP HOSE, Hon'ble W. R. COLLYER, Hon'ble C. W. KYNNERSLEY, Messrs. A. KNIGHT, R. N. BLAND, R. W. HULLETT, A. GENTLE, Dr. LEASK, Dr. HANITSCH, Rev. W. SHELLABEAR, Rev. J. E. BANKS, and H. N. RIDLEY.

The Minutes of the last Annual General Meeting were read and confirmed.

The Annual Report of the Council and the statement of accounts were read and on the proposal of the Hon'ble W. R. Collyer, seconded by Mr. Hullett, were passed.

The elections of Members during the year were confirmed by the meeting on the proposal of Mr. Hullett, seconded by Dr. Leask.

The officers and council for the present year were then elected, viz:

President.—Right Reverend BISHOP HOSE.

Vice President (*Singapore*) Hon'ble W. R. COLLYER.
„ (*Penang*) DR. BROWN.

Honorary Secretary, H. N. RIDLEY.
„ *Treasurer*, DR. HANITSCH.

Councillors, Hon'ble C. W. KYNNERSLEY, MR. R. N. BLAND, Rev. W. G. SHELLABEAR, MR. R. W. HULLETT, and H. H. ESCHKE.

ANNUAL REPORT OF THE COUNCIL

OF THE

Straits Branch of the Royal Asiatic Society,

FOR THE YEAR 1899.

——— :o: ———

In presenting this Report, the Council are pleased to state that the affairs of the Society are financially more satisfactory than ever.

Since the last General Meeting the following new Members were elected, subject to the confirmation of the General Meeting.

Rev. J. A. B. Cook.	Mr. Francis Pears.
Mr. J. C. Sugars.	Rev. F. W. Haines.
Mr. R. C. Edmonds.	Dr. A. B. Barker.

The Council regret to have to record the loss by death of Sir Charles Bullen Mitchell, Patron of the Society, Dr. de Vicq, (Councillor) and Mr. Koe.

The new map was received at the commencement of the year and was in much demand, one hundred and forty copies being sold in Singapore, and one hundred and twenty nine in England. Copies were presented to the Sultan of Johore, and to Prince Devawongse, who had materially assisted in its publication. One Journal, (No. 32) was published during the year, and another in the course of printing will be shortly in the hands of the Members.

A large number of books, pamphlets and journals were presented to the Society or received in exchange from kindred Institutions.

Honorary Treasurer's Cash Account, for the year ending 31st December, 1899.

Dr. *Cr.*

		$	c.			$	c.
1899	To Balance in Chartered Bank	1337	50	1899	By American Mission Press for printing of Journal No. 32	452	90
	,, Do. Mercantile Bank	249	76		,, Ed. Stanford for printing new maps	1010	53
	,, Subscriptions for 1896	10	00		,, Booklinder (mounting of maps, $237.30; binding of books, $217.577 ...	454	87
	,, do. ,, 1897	10	00		,, Advertisements ...	17	58
	,, do. ,, 1898	55	00		,, Furniture	10	00
	,, do. ,, 1899	365	00		,, Commission to collector	10	00
	,, do. ,, 1900	20	00		,, Clerk's Salary	60	00
	,, Life Members	100	00		,, Petties and Postage ...	48	22
	,, Sale of Journals	157	59		,, Fixed Deposit (Mercantile Bank)	1000	00
	,, Sale of Maps	1568	67		,, Balance in Chartered Bank	309	01
	,, Interest on Cash Balance, Mercantile Bank	14	47		,, do. Mercantile Bank	514	88
		$3887	99			$3887	99

Audited and found correct.

R. N. BLAND.

R. HANITSCH,

Honorary Treasurer, Straits Branch, Royal Asiatic Socie

A Trip to Mt. Penrissen, Sarawak.

At midday on the 5th of May of this present year of grace, Mr. E. A. W. Cox, of the Sarawak Government service, and myself left Kuching for the upper waters of the Sarawak river on a long talked-of collecting expedition. Our ultimate destination was Penrissen, a mountain of 4,800 feet high, five miles from the "ulu" of the left hand branch of the Sarawak river, and about fifty miles as the crow flies from the sea-coast. The mountain had previously been scaled, in part at least, by Signor Beccari, Mr. A. H. Everett, Dr. G. D. Haviland and Mr. Henderson, but had never, from a zoological point of view, been thoroughly collected over, so that our hopes of obtaining interesting and valuable results ran high.

Our staff consisted of five Dyak collectors, Malay and Chinese boys, and a Chinese cook; to convey these, ourselves and our somewhat bulky baggage, three boats were requisitioned, but as events turned out proved insufficient; however the start was fair and through the lower reaches of the river all went well and comfortably. The night was spent in part at the little village of Selobang, but to catch the tide and to avoid the din of a neighbouring Chinese "wayang," we re-embarked at 12 p.m. and proceeded quietly on our way till at 6.30 in the morning the first "karungan" or gravel bed was encountered; here we stopped for breakfast and a delightful bathe in the now somewhat rapid river. At 9 we were on again, and soon began to experience some difficulty in progression. The river abounded with shallows and small rapids; up and over these our heavy and heavily-laden boats, which to use a Malay expression "ate much water," were poled and hauled only with the greatest difficulty and exertion. At the very bad places a general halt had always to be called, whilst the respective crews joined forces and hauled with ropes one boat up at a time. Late in the afternoon we finally won to Segu, and right glad were we to partake of the

hospitality offered to us by the gentlemen then in charge of the Government coffee-estate at that place. Profiting by our experience we exchanged next day one of our heavy boats with its Malay crew for two lighter boats with crews of Land-Dyaks; these men are experts in the art of poling up against a strong and shallow stream and the women are not far behind the men. It was amusing to hear our new recruits coaching our Malay crews, the latter though secretly acknowledging the superiority of their advisers as polers were too proud to take advice in any form from those they considered in every other respect beneath their notice. With such valuable additions to our forces we proceeded up stream at a fair pace; the scenery was lovely, precipitous walls of limestone carved by the weather into every imaginable shape, rose high on either side. Their summits were clothed with a dense growth of trees and creepers, which in places almost roofed in the narrow channel up which we moved; the river itself here rippling over shallows or dashing through rocky gateways, there running calm and still under an overhanging cliff, ever added fresh beauty and interest to the scene. At night we tied up opposite the village of Burgor, and slept in the boats; an early start was made next morning and by midday, we arrived at Pankalan Ampat, thus completing the first stage of our journey. From here we dispatched messengers to the neighbouring village of Sennah, and in the evening had a visit from the Pengara and his youthful son. Thanks to a formidable looking "surat" from the Resident of Sarawak, we met with little difficulty in arranging the important matter of carriers, and were able next day to dispatch the heavy baggage to Sennah, following leisurely ourselves by river, preferring this to the dangers of a Land Dyak road with its picturesque though fragile bamboo bridges slung over nasty-looking places where a fall meant a broken bone or two.

On arrival at Sennah we were met with a cordial welcome by the Orang Kaya and conducted to the chief house of the village. This, as is usual amongst the Land Dyaks, consisted of four or five big houses all built up on tall piles at the summit of the most precipitous part of the river bank. The approach to the village consisted of notched logs, with or without a frail hand-rail of bamboo: communication between one house and

another is established by logs rounded or slightly flattened, generally as slippery as glass; in fact within the village itself no one ever walks on the ground. Beneath the houses pigs root and grunt, fowls cackle and boys fight, in a sodden mass of filth, the effluvium from which percolates freely through the open spaces between the floors of bamboo laths. The particular house in which we temporarily took up our abode was a well-built plank structure with billian attap roof, two large doors led out on to a spacious verandah at the back, which again gave on to a large open space surrounded by fowl-houses and sheds, and with ways leading off to other houses. Here and in the verandah much of the daily work is gone through, the house itself being reserved for cooking, eating and sleeping. In the verandah were a couple of large bell-shaped wooden vessels, half-filled with padi, and nearly all day long women were husking this by repeated thumpings blows administered by 3 or 4 foot poles; when husked, the padi is thrown into circular sieves of *rotan*, and shaken till the husks and broken grain are separated off. The Land Dyak man presents in his dress no particular feature of interest, a blue or red cloth "chawat," or a pair of Chinese trousers and a head handkerchief generally completing his garb. The women however are more picturesque: their sole garment is a short petticoat reaching to the knees, generally of blue cloth with a red border, but their arms from elbow to wrist and their legs from just below the knee to the ankle are encircled by rows of brass rings; a shell armlet and leglet generally topping each series of rings; even the little girls are burdened with these ornaments, though otherwise innocent of clothing, and when a number of girls of different ages are seen together it is quite possible to trace a gradual distortion of the calf of the leg due to the weight of metal borne; generally also several rings of *rotan* dyed red or black are worn round the waist, and out-of-doors a neat close-fitting cap made of palm leaf. There were few objects of ethnographical interest to be noticed in the house. Unlike the Sea Dyak, these people neither weave their cloth, forge their weapons nor make their pottery, but buy such necessaries from Malay and Chinese traders. However, I saw, coveted and subsequently purchased a curious

hat known as "Bok tumbis;" this was cylindrical, narrower at the top than at the bottom, 9 inches in height, made of coloured beads strung in striking patterns on five threads of *rotan*, the whole strengthened with uprights of thicker *rotan*. The top was open, and through the aperture the wearer—always a woman—pulls her hair, allowing it to stream out on all sides, it is only worn in dances during the annual harvest feast; the men on such occasions sometimes wear a necklet of tiger-cat's teeth alternated with the teeth of bats, squirrels and such like small deer. Besides elegantly-carved wooden handles for their *parangs*, baskets woven from *rotan*, without any distinctive pattern, and small oval wooden boxes for powder and shot, I could discover no other article which these people make.

That evening we held a great "bichara," and after overriding the almost countless objections to carry our baggage raised by one man after another, we endeavoured to get information concerning the summit of the mountain, its conformation, the water-supply, the animals and birds, and such like matters: many yarns were spun to us, and we received a large amount of information which subsequently proved to be mainly erroneous. Though Penrissen is the hunting ground of these Sennahs, but few had ascended to any considerable altitude, so they compensated for their lack of the knowledge we wanted by unlimited romancing. Though we rose early next morning, it was nine o'clock before we could make a start on our march to the mountain; our thirty to forty coolies wanted to take only the lightest loads, whilst we naturally wanted them to take those things which we needed most, leaving the rest to follow with further detachments of coolies from outlying villages, and the apportioning of weights was a long task. At length we made a move, and after wading across the river began our tramp. The way lay through old deserted padi farms overgrown with a dense but scrubby jungle; the country was undulating in the extreme, and the path the merest track, a foot or less in breadth, at frequent intervals interrupted by bamboo bridges and batangs, for the most part rotten. As the heat was intense we found walking very trying and difficult, and were glad at twelve o'clock to rest and discuss a meal. At one o'clock we were on again, and soon reached the lower slopes of the

mountain, and as these up to a height of 2,000 feet are clothed with bamboo jungle, we found the going much more easy. After crossing several mountain torrents, we reached late in the afternoon, at an altitude of 2,500 feet, a huge overhanging boulder of sandstone conglomerate, known to the Sennahs as Batu Tinong, and under this we pitched our our camp for the night. A dashing mountain stream was quite close by, and the delight of sitting under a foaming cascade of really cold water after our exhausting day was one not readily to be forgotten. Leeches had proved persistent and troublesome throughout the day, but in my opinion the annoyance caused by them has always been somewhat exaggerated.

Next morning we continued our climb until we had reached an altitude of 3,400 feet, when our guides called a final halt: the position was not particularly inviting, being a very small flat area totally shut in by tall jungle, whilst both to the front and rear the sides of the mountain sloped steeply downwards and upwards; however, as we were informed that there was no water to be had at any greater height, and further that all the Europeans who had previously visited the mountain had encamped here, we had perforce to acquiesce in our guides' decision. Our carriers made a clearing and proceeded to build us a hut; this took two or three hours to complete, as we insisted it should be commodious, solid and watertight; the poles and beams were of course felled in the jungle, and the floor, raised about two feet off the ground, was made with laths and saplings, whilst intertwisted palm-leaves served for roof and walls. Every felled tree produced a small harvest of insects; a few interesting butterflies invaded the clearing, amongst them *Cyrestis semnigra*, previously only recorded from Kina Balu, whilst in the undergrowth were found snails, scorpions and centipedes, all delightfully unfamiliar to the low-country naturalist. In securing these specimens and in rigging up shelves and sleeping-bunks in our hut, making all comfortable and snug, we spent the rest of the day.

On the following day (May 13th) Mr. Cox early started out to explore the mountain at a higher elevation, and at midday returned with the report that after a stiff climb of 400 feet he had reached a magnificent plateau of considerable extent,

where water was abundant and a good view readily obtainable, altogether infinitely superior to our present situation; our chagrin at having been deceived by our guides was great, but we decided to wait till the shooters returned from the jungle round about, whither they had early that morning been sent, before deciding whether it was worth while or not staying on in our present position. When eventually the hunters returned, the results of their labours were not very interesting, except the insects; of birds, a small robin-like species, dull in colour (*Alcippe cinerea*) was the only one at all characteristic of a mountain ornis. Mr. Cox therefore decided to visit next day the actual summit of the mountain, and if much of interest was seen or procured, to stay there for 10 days or a week. In accordance with this idea he and all the collectors, except one, whose services I retained, departed on the 14th. At mid-day I received word that they had reached the actual summit. Up to 4,500 feet the climbing had not been particularly difficult, but the last 300 feet was a sheer precipice of sand-stone conglomerate with a few narrow ledges at infrequent intervals, and to scale this, ladders had to be improvised; the summit was found to be quite flat, about half a mile long by two hundred yards broad, a dreary wilderness of pandanus and *rotan*, with hundreds of huge trees in every stage of life, from full and vigorous growth to absolute decay. Animal life was very scarce, and as a strong wind was blowing, bringing up a dense fog, Mr. Cox decided to descend to the foot of the cliff and encamp there. By the bearers of his message he sent down a specimen of the trogon, *Harpectes dulitensis*, and a gigantic earthworm nearly eighteen inches long.

During the next five days I collected assidously round about our hut and on the plateau already alluded to, dismissed our first batch of coolies and awaited the arrival of the rest of our baggage. This came up by degrees, until finally all our belongings could be bestowed in our hut and kitchen.

On the 18th, Mr. Cox sent down to say that he had moved lower down the mountain on to a peak known as Mt. Prang, altitude 3,500 feet, and as some most curious insect larvæ (*Vermileo sp.*) accompanied his letter, I determined to join him and investigate the life-history of the insect as fully as possi-

ble. At this station the hunters had erected a long lean-to on the side of the hill, and from it we had a most magnificent view of the country below us right down to the sea, fifty miles away. Unfortunately at this altitude our view was too frequently interrupted by fog and cloud, which generally swept up towards the middle of the day, and obscured everything till nightfall. From this station we made various expeditions round and about. Birds and mammals were extremely scarce, and the insects did not differ very markedly from those to be caught on the plateau; as, moreover, I had obtained alive several specimens of the fly-larva, *Vermi'eo sp* (?)* we decided to return to our original and comfortable quarters.

We descended on the 24th, and from then till the 30th lived a calm and uneventful life; our mornings from an early hour to nearly noon were spent in tramping through the jungle, hunting for birds, reptiles, insects, in fact, everything that had life in it; the afternoons in skinning, pinning out insects, bottling and labelling spirit specimens, and the other thousand and one duties which make a collector's life a busy one. An early dinner with bed to follow completed the day.

The return journey to Sennah was much like the first, save that it was accomplished in one day, one little incident only perhaps is worthy of note:—as we neared the foot of the mountain our carriers suddenly espied a small tree, which to our eyes presented no particular features of interest; however, loads were thrown aside in a hurry and a rush made for the tree, which was quickly hacked down and split up, and from numberless burrows in the wood, hundreds of a peculiarly scented, pinkish larva were extracted. No adults or pupæ were to be found, so beyond recognising the larva as that of a beetle, I was unable to determine the species or even family; these larvæ when boiled are considered a great delicacy by the natives of the district. They certainly looked much more appetising than the fat white grubs of the big coconut beetle which these people also devour with great gusto.

From Sennah we proceeded straight on to Pankalan Ampat, and after waiting a few days for boats and to collect

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* See this Journal for description of the habits of this curious larva.

revenue we returned to Kuching, arriving on June 4th.

Taken as a whole, the expedition was a great success, but the very great scarcity of mammals and birds was disappointing; only two kinds of monkey were seen. The cry of a solitary Wa-Wa was heard, but occasionally; pigs, deer, *kijang* and *pelandok* were noticeable only by their absence, and not a single game bird was procured or even seen. This scarcity I attribute to the fact that 60 per cent of the Dyaks of a by no means thinly populated district are armed with guns, which they constantly use, huge foraging parties going out before every harvest feast and keeping up for days a constant fusillade on anything above the size of a thrush; further I am inclined to suspect that this the Southern end of Sarawak in less faunistically rich than the more Northern regions. Certainly the list of birds which we obtained on Penrissen must compare somewhat unfavourably with those published by the late Mr. John Whitehead and by Mr. Charles Hose of Baram, two gentlemen whose labours on Mts. Kina Balu and Dulit are so well known in the zoological world.

Reptiles and amphibia were moderately abundant, and three species of fish were captured in a mountain stream by the use of *Tuba*. The invertebrate fauna was extremely rich, and much attention was paid to forming large collections of insects, and arthropods in general, and I am confident that, entomologically at least, no mountain in Borneo has been so well worked at as was Penrissen during our stay there.

Very little time was at our disposal to collect satisfactorily the flora of the mountain; the small collections made, however, have proved to be of such interest (see Appendix to the article) that I have determined to send back my collectors to the mountain in October, almost entirely to botanise.

Lists of the animals obtained will appear from time to time in this Journal in the order in which they are worked out. At present I am indebted to Mr. Ridley for working out the plants (Phanerogams only) obtained, and to His Lordship the Bishop of Singapore and Sarawak for the appended list of, and remarks on, the ferns.

R. Shelford.

APPENDIX I.

List of the Mammals of Penrissen.

1. *Hylobates leuciscus* Schreb. No specimen of this was captured.

2. *Semnopithecus rubicundus* Müll. Extremely common, not differing in any way from low-country specimens.

3. *Macacus cynomolgus* L. Two specimens were shot near the summit of the mountain, and were remarkable for the great length of the hair round the face.

4. *Hipposiderus* sp. (?) This is perhaps a new species, a matter to be decided by Mr. Oldfield Thomas, of the British Museum.

5. *Tupaia* sp (?) Closely mimicked by *Sciurus ereretti*. The species may possibly be *T. mülleri*, described lately by Kohlbrugge.

6. *Tupaia minor* Gthr.

7. *Ursus malayanus* Raffles. A large specimen of this bear was encountered as we were on our way down the mountain and, as guns were not handy, the animal made good his escape before a shot could be fired.

8. *Paradoxurus hermaphrodyta* Schreb. This and the following two species are about the only mammals which the Land Dyaks do not eat.

9. *Arctictes binturong* Raffles. Native name "tún."

10. *Herpestes brachyurus* Gray.

11. *Sciurus (Ratufa) bicolor ephippium* Müll. Somewhat to my surprise this squirrel was exactly the same as the variety obtained round Kuching. It is a species which varies

most markedly in different localities, mountain forms being as a rule much darker and redder.

12. *Sciurus hippurus* Geoff.

13. *Sciurus tenuis* Horsf.

14. *Sciurus* (*Funambulus*) *everetti* Thos.

15. *Nannosciurus melanotis* Müll. and Schleg.

16. *Mus margaretta* Thos. This pretty little mouse was seen about the house one evening, but it eluded all efforts to catch it.

17. *Sus barbatus* Müll.

18. *Cervus equinus* Cuv.

The Birds of Mount Penrissen and Neighbouring District.

The bird fauna of Mount Penrissen as evinced by collections made in the month of May of this year (1899) has proved to be most disappointingly sparse, and this list must compare somewhat unfavourably with those of the late Mr. Whitehead's collections on Mt. Kina Balu and of Mr. C. Hose's collections on Mt. Dulit. Not only was the number of species obtained small, but bird-life in general, with the exception of Barbets, was most noticeably scarce. I attribute this scarcity partly to the fact that the mountain has long been the happy hunting-ground of the Land Dyaks, 60 % of whom are armed with guns; all the game birds seem to have been shot or trapped, for we certainly neither saw nor heard one, whilst hornbills, profiting by a large experience of the sound of a shot, were very difficult to approach. A good collection of low-country birds was made at Pankalan Ampat, at the head of the left-hand branch of the Sarawak river, and about 10 miles from the foot of Penrissen. Amongst other good things we were fortunate enough to obtain there, was a specimen of a kingfisher, rare in Borneo, *Alcedo euryzone*.

With the exception of a small fly-catcher, too battered for description, and an obscure little greenish Timeling, allied to

Macornis, all the species obtained are well known, thanks chiefly to the labours of Mr. Hose on Mt. Dulit. As each of the above-mentioned specimens are unique, and as my knowledge of systematic ornithology is somewhat inadequate, I refrain from describing them, until further material can be obtained. I have followed the classification adopted by Mr. Everett in his list of Bornean birds (cf. this Journal No. 20, 1889,) and I have included those species obtained by Mr. Everett in a former expedition to Penrissen.

Family Turdidæ.

1. *Myiophoneus borneensis* Sclater, Ibis 1885, p. 123. One young specimen of this species was obtained, differing so markedly from the adult, that I was inclined to regard it as a new species; a subsequent careful comparison with a skin of a typical female from Mt. Dulit revealed its identity. The back wings and tail are of a very dark brown, and the feathers of the breast and head have the shafts and tips white, the webs of these feathers are not so well developed as in the adult, and there is no trace of any blue coloration on the wings. Feet purple. 4,100 feet.

2. *Copsychus saularis* L. Sharpe, Cat. B. vii. p. 65. Common everywhere in the low-country.

3. *Cittocincla suavis* Sclater. Sharpe, Cat. B. vii. p. 87. From Pankalan Ampat.

4. *Pomatorhinus borneensis* Cat. Sharpe. Cat. B. vii. p. 411. Low-country and up to 3,000 feet.

5. *Stachyris leucotis* Sharpe. Ibis 1878, p. 418. Penrissen 3,000 feet.

6. *Stachyris borneensis* Sharpe. Ibis 1887, p. 449. A common species on Penrissen. A nest with three eggs was found, the eggs are white (as is usual in this genus) and measure 21 by 16 mm: the nest is a loose ill-made structure.

7. *Malacopterum albigulare* Gray. Sharpe, Cat. B. vii. p. 568.

This species is eminently characteristic of the western end of Sarawak. Pankalan Ampat.

8. *Alcippe cinerea* Blyth. Sharpe, Cat. B. vii. p. 622. The commonest species on the mountain: the note is like that of a robin.

9. *Staphidia everetti* Sharpe. Ibis 1887, p. 447. Pankalan Ampat. The nest is neatly woven from vegetable fibres: the eggs are white with small brown spots, more thickly placed at the upper end.

10. *Turdinus sepiarius* Horsf. Sharpe, Cat. B. vii. p. 544. Penrissen from 2000 feet upwards. We did not find the typical mountain form *T. canicapillus* Sharpe recorded from Dulit and Kina Balu.

11. *Trichostoma rostratum* Blyth. Sharpe, Cat. B. vii. p. 562. Pankalan Ampat. Not at all common.

12. *Drymocataphus capistratoides* Temm. Sharpe, Cat. B. vii. p. 555. Pankalan Ampat.

13. *Kenopia striata* Blyth. Sharpe, Cat. B. vii. p. 573. Lower slopes of Penrissen.

14. *Turdinulus exsul*. Sharpe, Ibis 1888, p. 479. Penrissen (A. H. Everett).

Fam. Brachypodidæ.

15. *Hemixus malaccensis* Blyth. Sharpe, Cat. B. vi. p. 52. Found all over the mountain.

16. *Hemixus connectens* Sharpe. Ibis 1887, p. 446. This was one of the commonest species of this family on the mountain. The Dyak name "empulu" is applied to all birds of this species.

17. *Pinarocichla euptilosa*. Sharpe, Cat. B. vi. p. 62. Pankalan Ampat and Penrissen.

18. *Criniger diardi* Temm. Sharpe, Cat. B. vi. p. 76. A characteristically low-country form, common everywhere.

19. *Criniger ruficrissus* Sharpe. Id. Cat. B. vi. p. 81. Another common mountain "empulu."

20. *Criniger gutturalis* Bp. Sharpe, Cat. B. vi. p. 80. Penrissen and Pankalan Ampat.

21. *Criniger finschi* Salvad. Sharpe, Cat. B. vi. p. 84. Pankalan Ampat. This is generally found on mountains, and it was with some surprise that I obtained it at so low an altitude.

22. *Tricholestes criniger* Blyth. Sharpe, Cat. B. vi. p. 80. Pankalan Ampat.

23. *Trachycomus ochrocephalus* Gm. Sharpe, Cat. B. vi. p. 93. Pankalan Ampat.

24. *Pycnonotus simplex* Less. Sharpe, Cat. B. vi. p. 153. Pankalan Ampat.

25. *Rubigula webberi* Hume. Sharpe, Cat. B. vi. p. 171. Pankalan Ampat. We did not meet with this pretty little bird on Penrissen, where Mr. Everett formerly obtained it.

26. *Egithina viridissima* Sharpe. Cat. B. vi. p. 6. A very common low-country bird along the banks of rivers in their upper waters. One specimen was shot on Penrissen at an altitude of 3,000 feet. *Actiphia viridis* Bp. is common round Kuching and near the coast.

27. *Chloropsis zosterops* Vig. Sharpe, Cat. B. vi. p. 24. Pankalan Ampat.

28. *Chloropsis cyanopogon* Temm. Sharpe, Cat. B. vi p. 32. Pankalan Ampat.

29. *Chloropsis viridinucha* Sharpe. Id. Cat. B. vi. p. 31. pl. Pankalan Ampat.

Fam. Oriolidæ.

30. *Oriolus xanthonotus* Horsf. Sharpe, Cat. B. iii. p. 213. Penrissen. The only species of Oriole to be found on the

mountain, a most disappointing fact as I had great expectations of obtaining some typically mountain form.

31. *Dissemurus paradiseus* L. Sharpe, Cat. B. iii. p. 258. Ranges up to 3000 feet.

Fam. Muscicapidæ.

32. *Erythromyias mülleri* Blyth. Sharpe, Cat. B. iv. p. 200 pl. iv. f. 2. Penrissen (A. H. Everett).

33. *Erythromyias sp. n (?)*

One badly shot specimen of a little fly-catcher belonging to this genus was obtained: it was quite impossible to sex the bird and it would be unwise to describe it until further material is obtained. The plumage of the upper parts and wings are as in *E. mulleri*, but the breast is ashy and the lower halves of the outer tail-feathers are white. Penrissen 4,100 feet.

34. *Rhipidura perlata* S. Mull. Sharp, Cat. B. iv. p. 328. Common up to 3000 feet.

35. *Tersiphone affinis* Blyth. Sharp, Cat. B. iv. p. 349. Low country and up to 3000 feet. Known as the "rain-bird" by the natives.

36. *Philentoma velatum* Temm. Sharpe, Cat. B. iv. p. 365. Ranges up to 4000 feet. The young male resembles the adult females very closely, but the plumage on the abdomen and rump is generally admixed with earthy brown.

37. *Philentoma pyrrhopterum* Temm. Sharpe, Cat. B. iv. p. 366. Occurs side by side with the preceding species; both are easily called up to the gun. Mr. E. Bartlett former curator of the Sarawak Museum described in this Journal (April 1894) a new species of *Philentoma*, *P. manuelli*. I have examined the solitary specimen in the Museum collection and have very grave doubts of its distinctness from *P. pyrrhopterum*; a quite asymmetrical patch of chestnut on the breast is the only distinguishing feature, and prefer to regard the bird merely as a some-

what abnormal variation, until further material is obtained; but as seven years have elapsed since the specimen was shot and more or less continuous collecting in the same area has not brought to light a similar one, though both *pyrrhopterum* and *velatum* are common enough, I hold no very strong hopes of matching the specimen with another.

38. *Culicicapa ceylonensis* Swains. Sharpe, Cat. B. iv. p. 369. Penrissen and surrounding low-country.

39. *Siphia beccariana* Salvad. Sharpe, Cat. B. iv. p. 452. Penrissen 4,000 feet.

40. *Siphia (?) everetti* Sharpe, Ibis. 1890, p. 366. Penrissen 4000 feet.
I am not at all certain that I have identified this species correctly; its nearest ally seems to be *Stoparola panayensis* Sharpe from the Philippines, judging from a description of that species, the distinction between the genera *Stoparola* and *Siphia* is a very small one, merely a question of the proportion of culmen-length to breadth at the gape.

Fam. Nectariniidæ.

41. *Æthopyga temminckii* S. Müll. Gadow, Cat. B. ix. p. 16. Not uncommon on Penrissen above 3500 feet.

42. *Anthothreptes simplex* S. Mull. Gadow, Cat. B. ix. p. 114. Penrissen.

43. *Anthothreptes malaccensis* Scop. Gadow, Cat B. ix. p. 122. Pankalan Ampat. This species was not found on the mountain.

44. *Arachnothera flavigaster* Eyton. Gadow, Cat. B. ix. p. 109. Penrissen up to 4000 feet.

45. *Arachnothera longirostris* Lath. Gadow, Cat. B. ix. p. 103. Penrissen and Pankalan Ampat.
The nest composed of leaves is fastened to the under side of a leaf, two or three eggs are laid, often showing a

considerable amount of variation in their colouring; the most typical form is white with a suffused brown band circling the egg about its middle.

Fam. Dicæidæ.

46. *Prionochilus xanthopygius* Salvad, Sharpe, Cat. B. x. p. 66. Penrissen 4000 feet.

47. *Prionochilus maculatus* Temm. Pankalan Ampat. Sharpe, Cat. B. x. p. 69. Pankalan.

Fam. Meliphagidæ.

48. *Zosterops aureiventer* Hume. Gadow, Cat. B. M. vol. ix. p. 163. Penrissen (A. H. Everett).

49. *Zosterops squamifrons* Sharpe, Ibis. 1892, p. 323. Penrissen (A. H. Everett).

Fam. Sturnidæ.

50. *Calornis chalybea* Horsf. Sharpe, Cat. B. xiii. p. 143. Penrissen and Pankalan Ampat.

Fam. Corvidæ.

51. *Corvus macrorhynchus* Wagler. Sharpe, Cat. B. iii. p. 39. The crow was met with at considerable elevations.

52. *Platylophus coronatus* Raffl. Sharpe, Cat. B. iii. p. 318. Penrissen up to 2500 feet.

Fam. Pittidæ.

53. *Pitta arcuata* Gould. Scl., Cat. B. xiv. p. 431. Penrissen up to 4000 feet.

This was the only Pitta to be found on the mountain and its melancholy whistle was constantly heard. The nest is the usual loose bundle of leaves and grass characteristic of the members of this family and the eggs are white, spotted with grey and brown in an irregular band above the middle; they measure 30 by 22 mm.

Fam. Eurylæmidæ.

54. *Calyptomena viridis* Raffl. Scl., Cat. B. xiv. p. 456. Pankalan Ampat: the mountain forms *C. Whiteheadi* Sharpe and *C. hosii* Sharpe were not found.

55. *Eurylæmus ochromelas* Raffl. Scl., Cat. B. xiv. p. 465. Common in the low-country.

56. *Cymborhynchus macrorhynchus* Gm. Scl., Cat. B. xiv. p. 468. Pankalan Ampat.

Fam. Cypselidæ.

57. *Collocalia fuciphaga, (?)* Thunb. Hartert, Cat. B. xvi. p. 498. Numerous swifts, probably of this species, were seen just below the summit of the mountain. None were procured, however.

Fam. Picidæ.

58. *Susia abnormis* Temm. Hargitt, Cat. B. xviii. p. 557. Pankalan Ampat. An omen bird of the Dyaks.

59. *Chrysocolaptes validus* Temm. Hargitt, Cat. B. xviii. p. 458. A pair of this handsome woodpecker was shot on Mt. Seruru, a spur of Mt. Penrissen at an altitude of 4,300 feet.

60. *Chrysophlegma malaccense* (Lath.) Hargitt, Cat. B. xviii. p. 126. Penrissen and surrounding low country.

61. *Gauropicoides rafflesii* Vig. Hargitt, Cat. B. xviii. p. 132. A low-country form: the young male differs very markedly from the adult, nearly the whole of the under surface being dusky, the red crest smaller, the top of the head dark, and with a white patch on the side of the throat.

62. *Miglyptes grammithorax* Less. Hargitt, Cat. B. xviii. p. 385. Pankalan Ampat.

63. *Micropternus badiosus* Temm. Hargitt, Cat. B. xviii. p. 400. Pankalan Ampat.

Family Alcedinidæ.

64. *Alcedo euryzone* Temm. Sharp, Cat. B. xvii. p. 154.
Pankalan Ampat, banks of river. We noticed the bird when descending the river from the Dyak village of Sennah to Pankalan Ampat, and about a week later my collectors shot it. Unfortunately by this time I had returned to Kuching, and was consequently unable to sex the bird myself or to make colour notes, and I am afraid that as a result of native carelessness, the present label "female" is untrustworthy. The specimen is a very small one, the total length being only 6.5 in. as against 8 in., the total length of the full-grown adult. It possesses the blue pectoral band spotted with white, characteristic only of the male, and the lower parts are not ferruginous as is usual in females: in many small points this specimen differs slightly from Dr. Sharpe's description (l. c.) but nevertheless I am sure that my identification is correct.

65. *Ceyx (?) erythræa* Sharpe. Sharpe, Cat. B. xvii. p. 179.
The genus Ceyx is in a most confused condition, and I am therefore extremely doubtful about a young specimen of this little Kingfisher which was shot close to the summit of Penrissen. The bill is extremely short: ·8 inch, as against 1.5 of the adult, and is black, paler towards the tip instead of coral red. The wing-coverts and scapulars are red and there is no blue spot behind. The wing coverts as in *C. erythra*, but there is a black frontal patch as in *C. dilluyni*: further *C. dilluyni* has been found on Dulit, but *C. erythra* has not; I am therefore completely puzzled as to the correct name for our Penrissen specimen, and must wait until I can see more young specimens of both species before absolutely deciding.

66. *Halcyon concreta* Temm. Sharp, Cat. B. xvii. p. 285. Mt. Penrissen 3000 feet.

Family Bucerotidæ.

67. *Rhinoplax vigil Forst.* Grant, Cat. B. xvii. p. 427.
The note of this bird, well represented by its native name

"Tajak," was frequently heard on the mountain. but we did not secure a specimen.

68. *Rhytidoceros undulatus* Shaw. Grant, Cat. B. xvii. p. 382.
Not common on the mountain.

69. *Anorhinus galeritus* Temm. Grant, Cat. B. xvii. p. 391.
The commonest species: but none of this family were easy to get, owing to their excessive shyness.

70. *Berenicornis comatus* Raffl. Grant, Cat. B. xvii. p. 423.
Penrissen.

Fam. Meropidæ.

71. *Nyctiornis amicta* Temm. Sharpe, Cat. B. xvii. p. 90.
Pankalan Ampat.

Fam. Trogonidæ.

72. *Harpactes diardi* Temm. Grant, Cat. B. xvii. p. 182.
Low-country and lower slopes of Penrissen.

73. *Harpactes kasumba* Raffl. Grant, Cat. B. xvii. p. 183.
Occurs with the preceding species.

74. *Harpactes duvaucelii* Temm. Grant, Cat. B. xvii. p. 191.
Pankalan Ampat. All the above are omen birds with the Dyaks.

75. *Harpactes dulitensis* Grant. Cat. B. xvii. p. 502, pl. xvii.
Penrissen from 3,000 feet upwards to the summit. Previously recorded from Kina Balu and Dulit. It is closely allied to *H. oreskios* Temm. from which it differs slightly in coloration.

Fam. Podargidæ.

76. *Batrachostomus affinis* Blyth. Hartert, Cat. B. xvi. p. 638.
Common at Pankalan Ampat, where it was frequently seen hawking insects round the tops of trees at twilight: the flight is peculiar and quite unmistakable.

Fam. Capitonidæ.

77. *Chotorhea chrysopsis* Goffii. Shelley. Cat. B. xix. p. 59. Penrissen above 2,000 feet. The "kayu ara" was in fruit, and this and the two following species of barbets were excessively common, huge flocks sometimes nearly covering the trees bearing their favourite fruit.

78. *Cyanops mystacophanes* Temm. Shelley, Cat. B. xix. p. 72. All over the mountain. This bird exhibits considerable variation in plumage in relation both to sex and age (cf. Salvadori Occ. Bor. Tav. I): a very interesting young female specimen was obtained, almost entirely green, with a few blue feathers on the cheeks and round the gape, and without a trace of the red and yellow plumage of the adult.

79. *Mesobucco eximius* Sharpe. Ibis, 1892, p. 324, 1893, pl. xi. Penrissen above 2,000 feet.

80. *Calorhamphus fuliginosus* Temm. Shelley, Cat. B. xix. p. 51. Lower slopes of Penrissen and the surrounding low-country.

Fam. Cuculidæ.

81. *Surniculus lugubris* Horsf. Shelley. Cat. B. xix. p. 227. A low-country species.

82. *Cuculus micropterus* Gould. Shelley. Cat. B. xix. p. 241. Pankalan Ampat. One female in young plumage with the head and neck mottled with fulvous was obtained.

83. *Rhinortha chlorophæa* Raffl. Shelley, Cat. B. xix. p. 393. A common low-country species.

84. *Rhopodytes borneensis* Bp. Shelley, Cat. B. xix. p. 389. Low-country. Native name "Mindu."

85. *Phœnicophoes microrhinus* Berl. Nov. Zool. p. 71. Vol. II. 1895. Low-country. This form has been separated off from *Perythrognathus* by Berlepsch (l. c.) on account of the difference in the shape of the nasal apertures, perhaps

rather a sub-specific than a specific distinction. The following is a tabular arrangement of Berlepsch's views concerning the genus *Phænicophaes*. The genera adopted in the Brit. Mus. Cat. being placed in brackets.

P. pyrrhocephalus Forst. Ceylon.

P. (*Urococcyx*) *æneicaudus* (T. & E. Verr.) Mentavei Is.

P. (*Urococcyx*) *erythrognathus* Bp. Malacca and Sumatra.

P. (*Urococcyx*) *microrhinus* Berl. Borneo and Natuna Is.

P. (*Rhinococcyx*) *curvirostris* Shaw. Java.

P. (*Dryococcyx*) *Lavingtoni* Sharpe. Palawan.

P. (*Rhamphococcyx*) *calorhynchus* Tem. Celebes.

86. *Zanclostomus javanicus* Horsf. Shelley, Cat. B. xix. p. 380.
Penrissen 3,000-4,000 feet.

FAM. COLUMBIDÆ.

87. *Macropygia ruficeps* Temm. Salvadori, Cat. B. xxi, p. 360.
Penrissen 4,000 feet.

88. *Osmotreron olax* Temm. Salvadori, Cat. B. xxi p. 64.

APPENDIX II.

Plants collected at Penrissen.

By H. N. Ridley.

This collection, though a small one, contains a large proportion of novelties, showing that a more complete botanical survey would be well worth making. The plants obtained are of typical Bornean mountain flora facies. and most closely resemble the plants of Kina Balu in North East Borneo.

Smerila borneensis Cogn. at 3,500 feet; flowers white, stamens yellow.

,, ,, Var (?) A smaller plant nearly glabrous, common.

Begonia borneensis. A. D. C. At 3,000 feet alt.

Argostemma gracile Stapf. Mt. Seruru, a Peak of Penrissen, 4,500 feet. Only previously known from Mt. Kina Balu.

Ophiorrhiza fibrillosa n. sp.

Stem over a foot tall, rather stout, covered with short scattered brown hairs. Leaves lanceolate acute at both ends 12 nerved, 4 inches longer less, $1\frac{1}{2}$ inch wide green and glabrous above glaucous beneath and nerves covered with red hairs, petiole $\frac{1}{2}$ inch long covered with red hairs. Stipules narrow divided into two branches each ending in subulate fibrils, persistent $\frac{1}{4}$ inch long hairy. Cymes in terminal axils much shorter than the leaves covered with red wool, about an inch long. Flowers shortly petioled white, Calyx pustular teeth short acute. Corolla tube dilate at base $\frac{1}{4}$ inch long, lobes short oblong obtuse pustular. Stamens oblong obtuse, filaments very short. Style slender, stigma broadly bilobed lobes rounded. Fruit absent. At 4,000 feet, flowers white.

Allied to *O. subfalcifolia* Miq. The stipules are peculiar in being broken up into fibrils, and being persistent, and are

crowded together in the terminal buds, giving them a curious tufted appearance.

Rhododendron cuneifolium var. *subspathulatum.*

A much branched twiggy plant, leaves mostly spathulate apices not truncate as in the type ; flower tubular, lobes quite rounded. At 4,500 feet. Flowers red waxy. This might perhaps be distinguished as a separate species, but the materials, comprising but a single flower, are hardly adequate. The type was obtained on Kina Balu by Dr. Haviland.

Nepenthes tentaculata Hook fil. The only species seen, on the top of a felled tree, at 4,000 feet altitude. Not rare in North Borneo.

Eria megalopha n. sp.

Rhizome slender $\frac{1}{8}$ inch thick covered with short brown sheaths, roots long and wiry. Stems distant $\frac{1}{2}$ to an inch apart slender slightly thickened above, covered with brown short scattered sheaths, 4 to 5 inches tall less than $\frac{1}{8}$ inch through. Leaves 2, narrow lanceolate acuminate base acute 7 nerved $3\frac{1}{2}$ inch long $\frac{1}{2}$ inch wide. Flower orange from a tuft of papery brown sheaths $\frac{1}{2}$ inch long, above the leaves. Pedicel and ovary very slender $\frac{5}{8}$ inch long. Upper sepal lanceolate $\frac{1}{2}$ inch long, lower ones broader subfalcate. Petals linear lorate, narrower. Lip $\frac{1}{2}$ inch long, base narrow fleshy curved, with a process at base, lateral lobes falcate obtuse broad, terminal one broadly subquadrate margins rounded. Apex broad truncate $\frac{1}{4}$ inch across ; two low rounded ridges between the lateral lobes, and a single large thin keel edge denticulate running the whole length of the midlobe and ending in a projecting point, with three short parallel ridges on each side at right angles to central ridge. Column long arched. At 4,000 feet alt. Flower orange. Allied to *E. neglecta* Ridl. but differs in its very slender stems, remote from each other, and remarkable lip with an unusually large central keel.

Calanthe Shelfordi n. sp.

Leaves nine, petiole 3 inches long tapering into the lanceolate acuminate blade 1 foot long, 2 inches across, five nerved,

herbaceous plicate. Raceme 8 inches long slender. Flowers numerous flesh color, nearly an inch across. Pedicels slender $\frac{1}{2}$ to $\frac{3}{4}$ inch long. Sepals oblong lanceolate acute, upper one broadest. Petals broadly spathulate acute. Lip 3 lobed much shorter $\frac{1}{4}$ inch long, lateral lobes short rounded, median elongate linear oblong apex dilated rounded then acute; spur $\frac{1}{2}$ inch long pendulous dilated and hooked at apex; calli on lip 2 small wartlike processes. Clinandrium deep edges thin elevated undulate, rostellum long acuminate. At 4,800 feet near summit. Flowers flesh color. Perhaps as near *C. Curculigoides* as any species, but with a more slender raceme and a very different lip.

APPENDIX III.

List of the Ferns of Penrissen.

BY BISHOP HOSE.

1. *Trichomanes maximum* Blume. 4,100 feet, common.
2. *Davallia* (*Humata*) *pedata* Smith. 3,500 feet.
3. *Lindsaya cultrata*. Swartz.
4. „ *concinna* Smith.
5. „ *scandens* Hk.
6. *Polypodium* (*Goniopteris*) *firmulum* Baker. Previously recorded from Mt. Dulit only.
7. „ (*Eupol*) *decorum* Brack. 3,500 feet.
8. *Polypodium hirtellum* Bl. This species is new to Borneo, being previously recorded from Java, Perak, Ceylon, Phillpines and China.
9. *Polypodium obliquatum* Bl. Also new to Borneo.
10. „ (*Goniophlebium*) (?) sp. nov. This is a very interesting fern. "No other simple form of the sub-genus has been found in this part of the world, so far as I know." (G. F. S. & S.)
11. *Nephrodium* (?) *lineatum* Coleb. None of the fronds fertile. If correctly identified, new to Borneo.
12. *Acrostichum* (*Chrysodium*) sp. (?) near *blumeanum* Hk. No fertile fronds.

LYCOPODIACEÆ.

Selaginella atroviridis Spring var. (?) Differs from the type in having unusually long cusps to the leaves of the upper plane. There is so fruit on it. Common.

S. obesa Bak. Specimens without fruit. Common.

Mosses and Hepatics collected by A. H. Everett and named by F. Brotherus.

Mosses.

Calympores cristatum Hampe.

Neckera gracilenta var. *flagellifera* Broth. n. var.

Choetomitrium leptoma Schwager.

C. orthorhyncham Bry. Jav.

Thuidium Everetti Broth. n. sp.

Hepaticæ.

Bazzania australis Lindenb.

R. Shelford.

The Flora of Singapore.

By H. N. Ridley.

Introduction. The island of Singapore with the small islands of Pulau Ubin and Pulau Tekong in the Johore strait and a few smaller ones lying within English waters form the area the flora of which is enumerated in this paper. The whole is little more than 200 square miles in extent and consists of undulating country, the highest hill being Bukit Timah with an altitude of 500 feet above sea level. The Geology of the island was the subject of a paper by Mr. J. R. Logan (Journ. As. Soc. Beng. xvi. p. 519, published in 1846), but unfortunately he much misunderstood it, mistaking sedimentary rocks for volcanic ones. The bigger hills, Bukit Timah, Bukit Mandai, and Tanjong Gol, are composed of a grey granite, which crops out again near Bajau, Changi and Pulau Ubin. The rest of the island is covered with sedimentary deposits of clays, gravels, and sands, often very ferruginous and permeated with bands of clay-ironstone, very much resembling that of some of the Wealden beds in Kent. This clay iron-stone has unfortunately received the name of Laterite here, a name properly applied to soils baked by a lava-flow, or other volcanic heat. These sedimentary rocks have never produced any fossils except some obscure traces of vegetable remains. They appear to have been derived from disintegrated and decomposed granite, the ironstone bands being formed in many cases at a much later date. No borings of any depth having been made it is impossible to say how deep these strata are, but it is probable that they are of very great thickness and comparatively modern, as appears to be the case in Selangor and elsewhere. In the south of the island in some spots the strata are very strongly upheaved.

Originally the island appears to have been covered with a dense forest, except along the mangrove edged rivers and the sandy tract of country lying between Tanjong Ru and Changi point. But soon after it was acquired, a great deal of this forest

was felled, partly for the value of the timber and partly for cultivation. Later a very large proportion of the cleared ground was abandoned, and became covered with secondary growth, or lalang, and every year still sees the disappearance of some woodland, so that in several of the localities quoted for certain plants in this list, such as Ang Mo Kio, few traces of any native plants can now be found. The names of many villages and districts are taken from trees which doubtless plentiful fifty years ago are now either very scarce or quite extinct. Such are Kranji (*Dialium*.) Changi (*Balanocarpus*), Tampenis (*Sloetia siderоxylon*), Tanjong Ru, the Cape of Casuarinas, Kampong Gelam, the village of *Melaleuca*. Extensively as the indigenous flora has been destroyed in this way, I have succeeded in finding most of the plants collected here by Wallich in 1822; and of those mentioned in his Catalogue which I have not recovered, some at least were evidently wrongly localised, having been probably collected in Penang. Many of the trees, however, which were probably formerly more abundant, are represented now by single specimens.

A few fairly large and representative tracts of jungle remain, and though in most cases much of the more valuable timber has been removed, these contain the most varied and interesting portions of the flora. Among the biggest trees therein are the *Dipterocarpeæ*, *Dyera*, *Dichopsis*, *Irvingia*, *Kumpassia*, species of *Mangifera*, *Artocarpus* and *Tarrietia*. Mixed with these are numerous smaller trees and shrubs of all orders, with rattans, and other palms, and especially in rocky spots and damp watercourses, are ground orchids, Scitamineæ, aroids, ferns, *Ebermaiera*, *Pentaphragma*, *Cyrtandra* and many other smaller plants. Here too grow the curious little saprophytes *Thismia*, *Sciaphila*, *Aphyllorchis*, *Burmannia*, etc. Many climbing plants such as *Uncaria*, *Willughbeia*, *Bauhinia*, *Strychnos* and *Gnetum* form huge lianes climbing to the tops of the trees and covering them with a mat of foliage. On the branches of the loftiest trees grow many epiphytes not met with elsewhere, orchids, ferns, such as the rare *Davallia triphylla*, *Rhododendron*, *Vaccinum* and *Dischidia*, and it is interesting to note that many of these plants, which in the low country grow only on this elevated position, are to be met with as terrestrial or rock plants at greater elevations in the peninsula. The banks of the larger streams and rivers and a

good portion of the coast line where mud is deposited are edged with a thick mangrove jungle composed of *Rhizophoraceæ* (*Rhizophora*, *Bruguiera*, *Ceriops*) *Carapa*, *Lumnitzera*, *Avicennia* and *Heritiera* on the branches of which grow abundance of small orchids, ferns, *Lycopodium*, *Psilotum*, *Heptapleurum*, *Pachycentria*, *Medinillopsis* and other epiphytes, while in the mud on suitable spots grow such herbaceous plants as *Acanthus*, *Cryptocoryne ciliata*, *Tristellateia*, *Oethocharis* and some Cyperaceæ and grasses. Inland just behind the mangroves the ground is often sandy and covered with woods of comparatively small trees, *Eugenia*, *Podocarpus*, *Gelonium*, *Arytera*, *Afzelia*, etc., with clumps of the Nibung palm (*Oncosperma tigillaria*), and on these and on the ground grow many orchids, *Cirrhopetalum*, *Bulbophyllum*, *Coelogyne*, *Plocoglottis*, *Platyclinis*, and *Eria*.

The coast line from Tanjong Ru to Changi is also very sandy, and here is a very distinct flora much resembling that which borders the Pahang river near its mouth. It is rich in grasses and sedges, *Xyris*, *Cyanotis*, and other herbaceous plants, with bushes of *Rhodomyrtus*, *Vaccinium*, *Leucopogon*, *Capparis*, *Eugenia*, etc. Unfortunately a great portion of this district has been put under coconut cultivation, and the greater part of the flora has disappeared, except at Changi point where it still remains.

As a very large portion of the island has been cleared and cultivated, and often abandoned, there are very large tracts covered either with Lalang (*Imperata cylindrica*) or fern either *Gleichenia Linearis* or bracken, *Pteris aquilina* or in swampy spots with *Scleria* to the exclusion of almost everything else. In many places however secondary growth has sprung up (Belukar). This consists of small trees or shrubs of *Macaranga javanica* and *M. hypoleuca*, *Rhodamnia trinerria*, *Adinandra dumosa*, *Vitex pubescens*, *Melastoma polyanthum*, *Archytea Vahlii*, *Arthrophyllum diversifolium* and a few others.

In waste ground near villages and in cultivated spots are a number of weeds, many of which are well known as very widely distributed plants, and most of which have probably been introduced accidentally or intentionally at no very great distance of time. These weeds include most of the *Compositæ*, Grasses, *Labiatæ* and probably all the *Umbelliferæ* and *Solana-*

cea. It is perhaps worth noting that very few of these are to be found in Wallich's collection made in 1822, showing that in all probability they were introduced at a later date Among these weeds one or two are interesting as not occurring in India, such are *Clitoria cajanifolia*, and *Cleome aculeata*, both South American plants, which also occur as weeds in Java, whence probably they were carried accidentally to Singapore.

The flora geographically speaking is typically Malayan, and resembles as might be expected that of Johore, and to a certain extent that of the neighbouring coast of Sumatra. A few plants occurring here are as far as is known endemic, but it is probable that most will be re-discovered in the neighbouring countries, when they are more thoroughly explored. These endemic plants not known to occur elsewhere are marked with a *. The absence of certain plants common in the peninsula is somewhat remarkable, such are *Eurya acuminata* and *Grewia umbellata*, and there are several striking plants to be found on the neighbouring islands, and on the coast of Johore, especially near Tanjong Kupang, which are quite absent from our flora. Of the native flora it will be noticed that the greater number of plants are either trees or shrubs, herbaceous plants being comparatively scarce in the forests, and chiefly to be found in the open country in the sandy district of the coast. Those of the forest region being usually epiphytes, orchids, Piperaceae, or Scitamineae, aroids, grasses and sedges, with a few saprophytes.

The most extensively represented orders here are those of the *Euphobiacea*, *Urticacea*, *Rubiacea* and *Orchidea*. The variety of the latter will surprise many residents who have probably seen not more than one or two species growing wild here, but the fact that these plants are very local and frequently occur on the upper branches of the loftiest trees, where they are difficult to see and to obtain, accounts for their being so often overlooked. The largest genera are those of the Figs (*Ficus*) and nutmeg (*Myristica*).

As in most equatorial regions, the number of species in proportion to the number of individuals is very large. A Malay jungle consists of innumerable trees, shrubs and climbers, all apparently distinct, and individuals of any one species occurring singly here and there, often very far apart, so that these forests

have a very different appearance from those of the more temperate zones, which frequently consist of but one or two kinds. The contrast is well seen in comparing the English flora with that of Singapore. In Singapore with an area of 200 square miles we have over 1,900 species of flowering plants, while the flora of the British Isles with an area of 121,115 square miles produces but 1,200 species, while of ferns we have here over 130 species, nearly double the number in Europe, and more than three times the number in the British Isles.

Seasons. There is no great amount of difference in the rainfall throughout the year, although as a rule heavier falls occur in December and January than at other times, so that plants here have no definite resting periods and are nearly all truly evergreen. Certain plants, however, such as *Cratoxylon formosum* and *Ficus Miquelii* shed all their leaves at tolerably regular intervals, remaining quite bare for one or two days, when the young shoots begin to unfold, and in a few days they are quite leafy again. This change is often but not always followed immediately by the appearance of the flowers, and often the young leaves thus produced are of a brighter green, or brilliant red, orange, white or blue. This change takes place usually three or four times a year, and every tree of the kind in the district undergoes the change on the same day. It is not till we get north of Penang that we find a definite period of rest in which all or almost all plants shed their leaves altogether and become quite bare. A good series of observations on these phænological phenomena would probably throw light on the causes of these irregular seasons.

Very few plants have a definite flowering month. A large number flower more or less steadily throughout the year. Others flower at regular periods three or four times a year, almost every plant of a given kind flowering simultaneously in the district. This is best known in the case of the Pigeon orchid. *Dendrobium crumenatum.* In this plant the flowers are produced at periods of a little over a month, or two months. The exact day differs in different parts of the peninsula, but in each district they all appear in the same day, and it is remarkable that plants brought to Singapore even from as far north as Siam open their flowers on the day for Singapore, and not on that for Siam. It

is not rare however to find certain plants of Pigeon orchid which do not flower on the regular day, but have a distinct day which they appear to keep to with equal regularity. A curious fact is that another species of *Dendrobium* (*D. crinifernm*) invariably flowers in Singapore on the day preceding that of *D. crumenatum*, whenever that happens to be. It might be thought that the weather in the district in which the plant was growing was the influencing agent, but this appears to have but little effect on the orchids. On one occasion (Dec. 5, 1893) the pigeon orchids developed their flowers so far that they were obviously ready to open them on that day, but an extraordinarily heavy rain retarded them, and the flowers opened the next day, but except in cases like this the weather previous to the flowering does not seem to make any difference to the date of flowering. Some few plants have a regular annual flowering season, such are *Calanthe curculigoides* in September, and *Grammatophyllum*, July and August. A certain number of trees flower only every fifth year, notably the *Dipterocarpeæ*. Every fifth year there appears to be an average higher temperature, and a period of greater dryness in May or June than in other years, and then and only then is it possible to obtain flowers of these trees. Such trees are most of the *Dipterocarpeæ*, *xanthophyllum Kunstleri*, *Canga* sp. In this case also all the plants in a given district flower simultaneously. It can easily be understood that it is very important to a plant that all should flower on the same day in order that they may be cross-fertilized by the insects that visit them, and this is especially the case in plants in which the flowers last but a single day, as in the case of the Pigeon orchid, but it is difficult to see how this is brought about. A good many trees seem to flower even less often than this and there are not a few which though apparently full grown healthy trees have not given flowers once in ten years.

Colors of flowers.

As is well known the colors of flowers depend to a large extent on the kind of insect fertilizer for which they are destined to prove attractive. The most abundant insects in the thick jungle are the flies (*Diptera*) and these appear often in enormous abundance when certain trees are in bloom. The Oaks and

Chestnuts, *Sindora* and *Kurrima* are particularly attractive to them and the roar of their wings can be heard often at some distance from the tree. The chief of these flies is a black *Musca* with red eyes. The flowers of fly-fertilized plants are usually small and green or whitish, generally possessing an unpleasant odor. Smaller herbaceous plants growing in dark shady woods often have deep brownish purple flowers sometimes with an odor of carrion, at others sweet and aromatic, such are *Amorphophallus*, *Thottea*, *Tacca* and many orchids. These are also fly-fertilized. Many trees produce masses of white flowers in large panicles or corymbs. These are very attractive to butterflies and bees, such are many of the Eugenias, *Evodia*, *Rhodamnia*, and *Melanorrhea*. I have noticed as showing the bearing of the color of the flowers on insect visitors, that while *Eugenia lineata* with corymbs of white flowers attracts innumerable butterflies and bees and the pollen-eating flies (*Syrpha*), another species of Eugenia with apple-green flowers, which is growing close by was not visited either by butterflies or bees, but by flies similar to those which visit the oaks. Pink flowers are not so common, and are usually visited by bees, as are the deep red blossoms of *Cratoxylon arborescens*, *Gomphia Hookeri*, and *Eurycoma*. Scarlet and bright reds are rare in Singapore except in introduced plants, but we have also the beautiful *Aeschynanthus*, *Rhododendron*, some *Loranthi*, and some species of *Hornstedtia*. The red flowers are most attractive to the Sun-birds, and to butterflies. Bright yellow flowers are chiefly to be met with in open country especially near the sea; such are *Wedelia*, *Xyris*, *Philydrum*, *Utricularia* (most), *Wormia*, *Timonius*, and *Gomphia sumatrana*. The rarest color of all is blue, which is also to be met with almost exclusively in open spots. *Burmannia coelestis*, *Commelina*, *Cyanotis*, *Urticularia affinis*, *Evolvulus*, *Monochoria*, *Desmodium heterophyllum*, are almost the only native blue flowers here.

Visitors to the tropics are often surprised by the apparent paucity and inconspicuousness of the flowers. This is partly due to the enormous proportion of foliage, which conceals the flowers, but the fact that the greater number of our flowers are adapted for fertilization by Diptera and small Hymenoptera, the most abundant insects in the forests, and are consequently small and green or whitish, accounts to a large extent for the small

amount of show that the blossoms make in the great masses of foliage.

Botanists. The number of botanists who have collected or studied the flora of Singapore is even more limited than that of Penang. The first of them was naturally *Sir Stamford Raffles* who aided by *William Jack* made extensive collections. all or almost all of which were destroyed in the burning of the "Fame." (For an account of Jack and some others of the Singapore botanists, see Journal 25. p. 163). Shortly after the founding of Singapore *Nathaniel Wallich* came to Singapore to recuperate after his great Nepaul expedition. He remained here about five months and established the first Botanic Garden, Nov. 1822, being Superintendent of it. This Garden, consisting of 48 acres, included the Government Garden on what is now known as Fort Canning Hill. After he returned to Calcutta, Jan. 1823, Dr. Montgomerie took charge of the Garden till 1827. Wallich seems to have promised to send an assistant from Calcutta Gardens, but did not do so. The Garden, which chiefly contained Nutmegs and Cloves, was abolished later, and no trace of it remains. Dr. Wallich seems to have taken some interest in the development of Singapore, and was one of a committee of three to fix on the site of the town. He built a house, Botany Hall, to stay in during his residence here.

His collection of dried plants was an extensive one, and was eventually distributed with the rest of the East India Company's herbarium. The greater number of species which he discovered here I have been able to find still in Singapore, but some appear to have quite vanished. This is not surprising when it is remembered that at that time the district in which he was collecting, *viz.* the neighbourhood of the town, was thick jungle, of which nearly every trace has now disappeared under cultivation. In his Catalogue many of the plants are localised "Singapore et Penang," and as I note that many of these are strictly hill plants occurring at a higher elevation than there is in Singapore. I take it that these plants were in a collection of which the exact locality was lost, and that the label perhaps should have been rather "Singapore or Penang." Some few however of the specimens labelled as from this region have never since been found in the peninsula, e. g. *Xylia dolabriformis*, a

well known Indian tree, and it is probable that the locality is quite wrong.

Col. Farquhar, the first Resident of Singapore, and *John Prince*, Resident Councillor in 1827, who took a little interest in the botany of the island, are commemorated in the names of some plants, e. g. *Myristica Farquhariana*, and *Erycibe Princei*, but little was done in botanical research for many years. In or about 1839, *Hugh Cuming* well known for his immense botanical and conchological collections in the Philippines, visited Singapore and also ascended Mount Ophir. While in the Straits he seems to have chiefly devoted himself to collecting orchids, and to have sent home a number of live ones, among which were *Coelogyne Cumingi*, and *Dendrobium longicolle*. *William Lobb*, orchid collector for Messrs Veitch, visited Penang and Singapore in 1845, but as mentioned in Journal 25, p. 166, his specimens from the Straits Settlements, Java and India were all mixed up in distribution, so that his localities as quoted in books are quite doubtful. Surgeon-General *Maingay* during his residence in Singapore made extensive collections, but many of these again were irregularly labelled, and some mentioned in the Flora of British India as from Singapore were probably either collected in Malacca or Penang.

Mr. Murton the first head of the present Botanic Gardens, 1875 to 1880, collected a number of plants, of which a few were sent to Kew, and a few, chiefly ferns, are still in the Botanic Gardens Herbarium. *N. Cantley*, who succeeded him, employed collectors and obtained a very large number of specimens, but unfortunately hardly any were strictly localised, and many labelled from Singapore in the herbarium, are either cultivated plants or from some part of the peninsula, so that in most cases I have been unable to quote safely from his herbarium.

Among other collectors whose names appear in books, associated to a small extent with Singapore plants, should be mentioned, Dr. *Thomas Oxley*, who wrote some papers in Logan's Journal, one of which dealt with the Flora of Singapore, but chiefly with Economic plants, while other papers treat of Nutmegs and Gutta percha. He seems to have collected plants, saying that he had collected between 40 and 50 orchids, but what became of his collections and manuscripts, I cannot find

out. He died in or about 1858.

Sir Robert Schomburgk, well known for his explorations in Guiana, where he discovered the Victoria regia, was appointed British Consul in Siam in 1857. He visited Singapore and collected a few plants there, which he sent to Kew, and which were described in the Flora of British India. Some of them, however, were evidently obtained from gardens.

Dr. T. Anderson, 1832 to 1870, was Director of Calcutta Botanic Gardens. He appears to have visited Singapore at some time, and obtained several plants of interest. He devoted himself to the *Acanthaceae*, and *Eranthemum Andersoni* Mast, a common garden plant here was named after him.

Mr. R. W. Hullett made some years ago an excellent herbarium of Singapore plants, which he eventually presented to the Botanic Gardens. Duplicate specimens were sent to Kew and to Calcutta, where they were named, and several new species bear his name.

In the following list all plants with no collector's name were obtained by myself or by native collectors employed at the Gardens, and the numbers attached are those of my distribution-series. Endemic species, not yet known from elsewhere are marked with an asterisk and introduced plants, which have not properly established themselves but which occur in waste ground and the like, are included in brackets. The Mosses, Lichens, Fungi and Algae, are deferred. Collections of these have been made and submitted to experts, and I hope to publish an account of them at a later date.

DICOTYLEDONS.

DILLENIACEÆ.

Tetracera Assa Dec. A scrambling shrub often forming thickets, flowers white or pinkish. Common in open country, Balestier plain, Sepoy lines, Fort Canning, Changi.

T. Assa var. Garden Jungle. A very different looking plant, but Dr. King considers it only a large form.

T. euryandra Vah. Climber not rare, Cluny Road, Kranji.

T. macrophylla Wall. Climber common in woods, but seldom to be found in flower. Tanglin, etc.

T. fagifolia Bl. Not common. Woods, Garden Jungle, Selitar.

Wormia. Large shrubs or trees with showy yellow or white flowers.

W. *suffruticosa* Griff. A large bush in damp open country. The flowers are about 3 inches across bright yellow. The fruits when ripe split open like a star and are rosy pink inside, with small black seeds covered with a scarlet aril. The leaves are rather curious from the way in which the winged petioles are closed over the buds. It flowers constantly all the year. Tanglin, Jurong, Pulau Ubin, Pulau Tekong.

W. *pulchella* Jack. A small bushy tree with oval deep green leaves and pale yellow flowers. It grows in wet places, Tanglin, Bukit Timah Road.

W. *tomentella* Bl. A tall stout tree. Garden jungle, Selitar, Bukit Timah.

W. *Scortechinii* King. A small tree with inconspicuous apetalous flowers. Rare, Garden Jungle.

W. *sp* near W. *oblongifolia*, but having anthers hairy all over and white flowers. Bukit Mandai.

Dillenia indica L. This grand tree with its huge white flowers is doubtfully wild here. It occurs near the Reservoir, Bukit Panjang.

MAGNOLIACEÆ.

This order, chiefly of trees of the hill districts, is not unrepresented here.

Talauma lanigera Hook. fil. A large bush rather than a tree with large white flowers and stiff dark green leaves. Damp woods, near Chan Chu Kang, Ang Mo Kio, Kranji, Choa Chu Kang.

T. elegans Miq. *Aromadendron elegans* Bl. A tall tree with grey bark about 40 feet tall and a foot through. Flowers white sweet-scented. Rare. Garden Jungle.

Kadsura cauliflora Bl. A climber with rough corky bark and rosy flowers growing on the stem. Garden jungle, Bukit Timah, Kranji.

K. scandens Bl. "Akar Dama Dama." Forests, Bukit Timah, Bajau.

To this order also belong the Champaks *Michelia Champaka*, and *M. longifolia* Bl. often cultivated for their sweet flowers.

ANONACEÆ.

Stelechocarpus Burahol Hook. fil. "Singapore Lobb." This Javanese plant has never again been collected in the peninsula and is probably wrongly localised.

Cyathostemma Scortechinii King. A big climber bearing small green flowers on the stem, and rather large orange fruits. Common Garden jungle, Bidadari, Bukit Timah, Jurong, Pulau Ubin.

C. Hookeri King. Not common. Flowers yellow. Garden jungle.

Uvaria. Climbers with purple rarely yellow flowers.

U. dulcis Dunal. Rare, Bukit Timah.

U. Lobbiana Hook. fil. Garden jungle,

U. Ridleyi King. Bukit Mandai.

U. macrophylla Roxb. Common all over Singapore.

U. hirsuta Jack. Very hairy, flowers bright red. Garden jungle, Changi. etc. Common.

U. subrepanda Wall.* Singapore (Wallich No. 6483). A very little known species, only collected by Wallich.

Ellipeia cuneifolia Hook. fil. A lofty climber with yellow flowers. Common. Garden Jungle, Reservoir Woods.

Cyathocalyx virgatus King. A small tree with green flowers. Rare, Bukit Timah (Hullett).

C. Maingayi Hook. fil. (Cantley's collection.) Perhaps wrongly localised.

Artabotrys. Climbers with white or green flowers, and very curious woody hooks by which the plant climbs.

A. Wrayi King. Flowers large. Cluny Road, Bukit Mandai.

A. suaveolens Bl. Flowers small. Common all over Singapore.

A. Maingayi Hook. fil. Tanglin.

Drepananthus pruniferus Maing. "Antoi hitam." A tall straight tree. Garden jungle, Kranji.

Unona discolor Vahl. "Akar Darah." Garden jungle.

U. dumosa Roxb. Cluny Road.

U. longiflora Roxb. Common, Kranji, Bukit Timah, Jurong, Garden jungle.

U. dasymaschala Bl. Common, Bukit Mandai. Chan Chu Kang Garden jungle.

U. desmantha Hook. f. A small tree with yellow flowers, Common, Garden jungle, Changi, Chan Chu Kang.

U. stenopetala var. A small tree with buff-colored flowers. Garden jungle, Changi, Bukit Timah.

Polyalthia. Small to medium-sized trees.

P. sumatrana King. Flowers green, fruit pink with darker blotches, rare. Chan Chu Kang.

P. Scortechinii King. "Kenanga hutan." A fairly large tree, with large yellow flowers like those of Cananga. Not common, Garden jungle.

P. macropoda King. A tree with large orange fruits very showy. Bukit Timah.

P. Teysmanni King. Common, Chan Chu Kang, Garden jungle.

P. bullata King. Stated in King's Materials to have been collected by me in Singapore, was collected by Cantley and perhaps wrongly localised. It occurs in Selangor and Perak.

P. cinnamomea Hook. fil. is from the same collection, and was also collected by Wallich in Singapore. I have never found it here.

Goniothalamus. Small or medium sized trees or shrubs.

G. malayanus Hook. fil. Bukit Timah, Pulau Damar.

G. Tapis Miq. Selitar, Jurong.

G. Ridleyi King. A medium-sized tree with large tufts of dull purplish flowers on the stem, chiefly at the base. Sungei Morai, Bukit Timah.

Orophea hastata King. Bukit Timah.

Popowia tomentosa Maing. A small tree. Not common, Garden jungle, Bajau.

P. ramosissima Hook. fil. Bukit Timah.

Orymitra calycina King. Dense woods, Garden jungle.

O. affinis King. Sumbawang, Bukit Timah.

Melodorum. Climbers with yellow flowers usually sweet-scented.

M. fulgens Hook. fil. Common in thickets, Bukit Mandai, Toa Payoh, Tengeh, Chan Chu Kang.

M. nanubriatum Hook. fil. Changi, Bedoh.

M. latifolium Hook. fil. Garden jungle, Toas, Selitar.

M. cylindricum Maingay. Common. Bukit Timah, Bukit Mandai, Chan Chu Kang, Loyang.

M. lanuginosum Hook. fil. Fairly common, Bukit Timah, Sumbawang, Jurong.

M. prismaticum Hook. fil. Garden jungle, Changi, Kranji.

M. elegans Hook. fil. Garden jungle, Selitar.

M. pisocarpum Hook. fil. Bukit Timah, Bukit Mandai, Toas.

Xylopia oxyantha Hook. fil. Singapore (Wallich 6178). Not seen.

X. dicarpa Hook. fil. * Singapore (Maingay). Not seen.

X. malayana Hook. fil. Not common, Bukit Arang, Chan Chu Kang.

X. caulata Hook. fil. Singapore (Wallich 6152) Maingay. Not seen.

X. magna Maingay. "Singapore Ridley" in Materials; was not collected in Singapore.

X. ferruginea Hook. fil. "Jangkang." A tall tree, flowers green, fruit long cylindrical red. Common, Bukit Timah, Selitar, Changi, Sungei Morai.

X. Ridleyi King. * Rare, Changi, Bukit Timah.

Phoranthus nutans Hook. fil. A shrub with green flowers. Common, Garden Jungle. Bukit Timah.

Ph. lucidus Oliver. Common. A bush. Bukit Timah, Garden Jungle, Tanjong Gol.

Mezzettia leptopoda Oliver. A very large tree with green flowers, and large globose fruit containing two very hard seeds, "Poko P'rah." Garden Jungle.

MENISPERMACEÆ.

Climbing plants with very small dioecious flowers and drupaceous carpels with the seeds usually curved.

Tinospora cordifolia Miers. Probably introduced. Macpherson Road, Balestier plain, Pulau Ubin.

Tinomiscium petiolare Miers. "Akar Lankap." A stout climber with milky juice, flowers white, fruit green with white spots. A decoction of the roots is used for rheumatism. Common in open woods, Garden Jungle, Siglap, Jurong, Bukit Mandai.

Fibraurea chloroleuca Miers. "Akar Kuning." A big woody climber with yellow juice formerly used in dyeing. The male flowers are white in large panicles on the stem. The females green. The fruit is about an inch long, orange-colored. Common all over Singapore.

Coscinium fenestratum Colebr. "Akar Kunyit, Kunyit Babi." A stout woody climber with large round leaves white beneath and large globular fruits. Common in woods. Chan Chu Kang, Changi, etc.

Hypserpa triflora Miers. A slender climber with narrow deep green leaves and small green flowers. Not common. Hedges, Tanglin, Selitar, Jurong, Chua Chu Kang.

Limacia velutina Miers. A low rather slender climber, the leaves covered with a velvety golden olive fur. Common in open country. Tanglin, Bukit Timah, Changi, etc.

L. Kunstleri King. A pretty little slender climber with white flowers and yellow stamens. Rare, on bushes by the sea. Changi beach.

Stephania hernandifolia Wall. A slender climber with peltate

leaves, white flowers and red fruits. Edges of jungle, not rare. Chan Chu Kang, Bukit Mandai, Jurong.

Cycl a peltata Hook. fil. var. *Arnotti*. Miers. A slender climber with orbicular ovate hairy leaves, small hanging panicles of green flowers and white flat fruits. The natives boil the leaves with sugar and make a kind of jelly not remarkably delicious. Common in hedges, Tanglin, Chua Chu Kang, Pulau Ubin.

NYMPHEACEÆ.

Barclaya Motleyi Hook. var. *Kunstleri*, "Daun Kalapa." This grows in shallow muddy streams in thick jungle. It has round dark-colored leaves, and inconspicuous dull colored flowers, greenish or brown outside and yellow and pink within. Capsule pink. Local, Bukit Timah, Ang Mo Kio.

(*Nelumbium speciosum* Willd. The Lotus is often cultivated by the Chinese, but not wild here.)

CAPPARIDEÆ.

Cleome aculeatum Jacq. *Cl. Hullettii*. King. An introduced thorny weed with white flowers, native of the West Indies, occurs round Tanglin and Kallang.

Cl. viscosa L. A sticky weed about a foot tall, with yellow flowers, occurs near the town casually.

Capparis Finlaysoniana Wall. A thorny climber with large white flowers with a yellow spot in the throat, and a sausage-shaped red fruit. Rare. In sandy spots near Changi.

VIOLACEÆ.

The only genus represented here is the shrubby *Alsodeia* with small yellow and white flowers.

Alsodeia echinocarpa Korth. "Sebilek." A shrub or treelet with ovate serrate leaves, small white flowers, and cap-

sules covered with mossy hairs. The seeds are used as a purgative. Common in dry woods. Reservoir, Chan Chu Kang, Chua Chu Kang.

A. floribunda King. Woods near Ang Mo Kio.

A. membranacea King. Ang Mo Kio, Changi.

A. Kunstleriana King. Singapore (Wallich). Not seen.

BIXINEÆ.

Scolopia rhinanthera Clos. A shrub or small tree, thorny with with white flowers and black berries. Sandy spots near the sea. Changi, Serangoon River.

Flacourtia Rukam Zoll. A thorny tree, with small yellowish flowers and globose dull red berries, with a taste of gooseberries. Common in woods and even in thick jungle, and evidently truly wild, but also planted. Bukit Timah. Chan Chu Kang.

Fl. cataphracta Roxb. "Rukam." A similar tree with smaller leaves. I do not think it is wild though often cultivated and established here and there. It a much better eating fruit than the last.

Fl. inermis Cl. A larger tree, quite unarmed, with thinner narrower leaves. Jurong and Tanjong Karong.

Ryparosa Hullettii King. A small tree with slender spikes of green flowers. Rare in forests, Bukit Timah. Sungei Buloh.

PITTOSPOREÆ.

Pittosporum ferrugineum Ait. "Giramong." A small tree with yellowish white flowers. Sea shores, Kranji, Changi, Selitar.

POLYGALEÆ.

Polygala brachystachya Bl. A little prostrate herb with yellow flowers, growing in turf or sandy spots. Not common, Gardens, Macpherson Road.

Salomonia cantoniensis Lour. A small branched weed about 3 inches tall with pink flowers. Common in waste ground.

S. oblongifolia Dec. Rare, sandy spots, Changi.

S. aphylla Griff. A very small buff colored saprophytic plant with minute flowers. Rare, in dense wet woods. Chua Chu Kang.

Trigoniastrum hypoleucum Miq. Small tree, flowers white. Bukit Timah.

Xanthophyllum. Large or small trees, with white or pink flowers and globose one or several seeded fruits. "Lima Beruk."

X. *palembanicum* Miq. A small tree, with white flowers. Woods, Garden jungle, Selitar.

X. *obscurum* Benn. A large tree with dark green shining leaves, flowers white tinted with rose. Fruit as large as a cricket ball, greyish green with a very thick woody rind orange color inside, and numerous seeds. Woods, Tanglin.

X. *ellipticum* Korth. A medium sized tree with deep green leaves. Flowers at first white then yellow, with a red calyx. Drupe globular orange turning dark red, with a sweet but rather soapy taste. Tanglin, Changi.

X. *affine* Korth. A small to medium sized tree, flowers white. The commonest species in the peninsula, but not common in Singapore. Woods, Bukit Mandai, Jurong, Bukit Timah.

X. *Kunstleri* King. A fair sized tree with dark green leaves, and golden buds, flowers white, fertilized by bees. Not common. Tanglin.

PORTULACACEÆ.

Portulaca oleracea L. Purslane. A common succulent prostrate weed with yellow flowers. Waste ground.

P. quadrifida L. A much smaller plant with tufts of white hair on the joints of the stem. Common in and round the town, on the wharfs, etc.

HYPERICINEÆ.

Hypericum japonicum L. Small herb with yellow flowers. Pepper plantations, Bukit Mandai, Chua Chu Kang.

Cratoxylon polyanthum Korth. Tree with loose red bark, flowers pink. Woods, Bukit Timah, Changi, Chan Chu Kang.

C. formosum Benth. A beautiful tree flowering twice a year. The flowers rose-pink, appear abundantly when the tree sheds its leaves. The leaves are red when just open, gradually becoming green. Common in open country, Tanglin, Bukit Mandai, Chua Chu Kang, Bukit Timah.

C. arborescens Bl. "Geronggang." A big tree 50 to 60 feet, flowers in panicles deep crimson. Woods, Garden jungle, Bukit Timah, Selitar.

GUTTIFERÆ.

Garcinia eugeniaefolia Wall. Tree, flowers white, sweet. Woods, Sungei Tengeh, Changi, Chan Chu Kang, Pulau Ubin, Tanjong Gol.

G. rostrata Benth. Flowers white or pink. Woods, Sungei Morai, Chan Chu Kang, Changi.

G. cuspidata King. Rare, Kranji.

G. Hombroniana Pierre. The peach-flavoured mangosteen. The tree resembles the common mangosteen, but the flowers are cream colored, the fruit smaller crimson, with a short beak on which is an entire dotted stigma, the rind is thin and scented like an apple, the pulp acid and scanty but peach-flavoured. Seashores, more rarely inland, Blakang Mati, Chan Chu Kang, Changi, Pulau Ubin.

(*G. mangostana* L. The mangosteen cultivated everywhere. A wild or reverted form with smaller more acid fruits, occurs near villages.)

G. utroviridis Griff. "Asam Gelugur." A beautiful tree, leaves bright red when young, deep green when old. Flowers large red. Fruit large succulent, flattened at both ends, and grooved all round, orange color stigma and persistent sepals red. It is dried in the sun and used in curries. It makes excellent preserves and pies. Doubtfully wild here. Tanglin, Tanjong Penjuru.

G. Griffithii T. Anders. "Kandis Gajah." Tree with large leaves. Flowers hardly opening greenish yellow. Fruit resembling an apple in form and color, acid, but eatable when cooked. Common in woods. Tanglin, Bukit Timah, Blakang Mati, Chan Chu Kang.

G. Bancana Miq. Tidal rivers, Kranji, Selitar.

G. nigrolineata Pierre "Kandis." Tree, unisexual, flowers small yellow, fruits small globose orange, eatable. Common, Woods and open country, Changi, Tengeh, Sungei Morai.

G. parvifolium Miq. Garden jungle.

G. Forbesii King. Small tree, flowers cream or pink, fruits small crimson, eatable. Not very common, Garden jungle, Bukit Mandai, Chua Chu Kang.

G. nervosa Miq. Rare, Pulau Ubin, Serangoon Road.

G. dulcis Kurz. "Mundu." Probably not wild here. Gardens and villages.

Calophyllum. Trees with white flowers and green or purplish drupes.

C. pulcherrimum Wall. Common, Garden jungle, Changi, Kranji.

C. spectabile Willd. "Bintangor Bunut." Garden jungle, Bukit Timah, Selitar

C. retusum Wall. Singapore, (Wallich).

C. canum Hook. fil. Not common, Tanglin, Bukit Mandai.

C. inophyllum L. "Penaga." Common on the sea shore. Bajau, Pulau Selitar, Pulau Ubin.

C. inophylloide King. Rare, Garden jungle, Changi.

C. Wallichianum Planch. "Bintangor Merah." Bukit Timah Chua Chu Kang.

C. Griffithii T. Anders. Rare, Sungei Morai.

C. macrocarpum Hook. fil. Changi.

TERNSTRŒMIACEÆ.

Trees with white or pink flowers usually rather small with many stamens.

Adinandra dumosa Jack. "Tiup-Tiup." A very common tree about 20 feet tall, with white flowers, which are fertilized by bees and wasps, and the pulpy fruit eaten by bats. Open country everywhere.

A. Hulletti King. Not common, Garden Jungle, Selitar.

A. acuminata Korth. Woods, Garden jungle, Sembawang, Chan Chu Kang.

A. maculosa T. Anders. Rare, North Selitar.

A. miquelii King. "Kwak." A very different looking tree with thick leaves and larger white flowers, and fruits of a Terustrœmia. Edges of Mangrove swamps, local, North Selitar, Changi, Sungei Morai, also woods, Bukit Timah.

A. sp. "Mongol." Rare, Bajau (4004).

A. near *integerrima* but less hairy. A big tree, Changi.

Ternstroemia penangiana Choisy. A big dense tree with dark green leaves and white flowers. Fruit egg-shaped about $1\frac{1}{2}$ inch long orange, splitting and showing 3 or 4 seeds enclosed in a red pulp. Dry woods near the sea. Bajau, Toas, Batu Putih, Changi, Pulau Tekong.

Sarauja tristyla Miq. Fern valley, Bukit Timah.

Pyrenaria acuminata Planch. A small tree with inconspicuous white flowers and small globular apple-like green fruits. Thick woods. Common, Bukit Timah, Tanglin.

P. Kunstleri King? Rare, Selitar.

Gordonia excelsa Bl. A tall tree with flowers like those of the tea plant but larger. Fruit a long woody capsule containing thin winged seeds. Rare, Selitar.

Var. with much larger coriaceous leaves, larger flowers and fruits. A very different looking tree, but referred by Dr. King to the same species. Common, Tanglin, Holland Road, Jurong, Changi.

Archytea Vahlii Choisy. "Riang-Riang." A bush or tall slender tree with pretty pink or white flowers. Common in secondary jungle. Tanglin, Jurong, Changi, Blakang Mati.

DIPTEROCARPEÆ.

Tall, often vast trees, with straight bare stems. Flowers large or small pink white or yellow, very sweetly scented. Fruit usually with two to four of the calyx lobes developed into long wings, by which the fruit drifts away from the tree in the jungle. The trees usually flower only once in five years. Very few flower annually. They supply good and useful timber, and the resin known as dammar and used for torches, and varnish, &c. Some also produce wood oil.

Dipterocarpus cornutus Dyer. "Minyak Keruing." One of the best wood-oil trees, even the fruits are often full of oil. Woods, Changi, Bukit Timah.

D. Hasselti Bl. Bukit Timah.

D. grandiflorus Blanco. This has very large winged fruits, 6 inches or more long, red. Bukit Timah.

Anisoptera glabra Kurz, "Mersawa." Garden jungle.

A. costata Korth. A gigantic tree with coppery looking leaves. Garden jungle, Dalvey, Bidadari.

Hopea Pierrei Hance. "Merawan." A tall straight tree with very small deep crimson flowers. Bukit Arang.

H. Griffithii Kurz. Garden jungle (No 4738).

H. micrantha Hook. fil. Singapore (Cantley).

H. Mengarawan Miq. A gigantic tree measuring as much as 18 feet in circumference. Common, Bukit Timah, Chan Chu Kang.

Shorea gratissima Dyer.* Flowers white. Common, Garden jungle, Kranji, Chan Chu Kang.

S. macroptera Dyer. "Kepong." The bark is used for building houses. Common, Garden jungle, Chan Chu Kang.

S. parvifolia Dyer. "Meranti daun Kechil." Bukit Timah, Garden jungle.

S. gibbosa Brandis. Flowers pink, Garden Jungle.

S. leprosula Miq. "Serayah batu." very common, Garden Jungle, Bukit Timah.

S. rigida Brandis.* Flowers white. Rare, Garden Jungle.

S. pauciflora King. Flowers yellow, Garden Jungle.

S. bracteolata King. Dalvey Road (No. 1827).

Cotylelobium flavum Pierre. Rare, Sungei Morai.

Vatica Ridleyana Brandis. Common, Garden Jungle, Bukit Mandai, Changi.

Pachynocarpus Wallichii King. "Damar Mata Kuching." Common, Garden Jungle, Kranji, Changi, Toas.

MALVACEÆ.

Herbs shrubs or trees with showy flowers.

Sida. Small shrubby plants with yellow flowers.

S. carpinifolia L. Common everywhere in waste ground.

S. rhombifolia L. "Silaguri Padang." A common weed used in native medicine for tooth-ache. Sepoy lines, Chan Chu Kang.

Abutilon indicum Don. Weed in waste ground. Alexandra Road, Pulau Ubin.

Urena lobata L. "Pulut-pulut." A very common weed with pink flowers opening in the early morning. The leaves are used for adulterating Patchouli, and it is cultivated for its fibre in America, where it is called Cesar-weed. Common in open dry spots; the variety *sinuata* with deeply lobed leaves occurs more usually near the sea.

Hibiscus, several species are cultivated, including *H. rosa-sinensis* L. the Shoe-flower, "Bunga Rayah," the flowers of which are used for blackening leather, and for coloring sweetmeats red. *H. abelmoschus* L. the Musk seed. "Kapas hantu," with large yellow flowers with a maroon centre, occurs cultivated and half wild. *H. Sabdariffa*, "Rosella," used as a vegetable or preserve. *H. esculentus* L. "Lady's fingers."

H. surattensis L. A prickly climbing or creeping plant, with yellow flowers and a maroon eye. Tanglin, Changi, Pulau Ubin.

H. tiliaceus L. "Baru." A common sea-coast tree with large yellow flowers with a maroon eye, turning pink soon after opening. All round the coast.

Thespesia populnea Corr. Tree very similar to the last. Sea coasts, common, Toas, Chan Chu Kang, Pulau Ubin.

(*Eriodendron anfractuosum* De C. The tree Cotton, "Kapok." Cultivated.)

(*Durio zibethinus* L. The Durian. Cultivated.)

D. oblongus Mast. A wild Durian, with green uneatable fruits. Woods, scarce, Bukit Timah, Bukit Mandai.

Neesia synandra Mast. The woody Durian. A big tree, with rather small flowers and large wooden blue-grey fruits,

which partly open, the walls inside are covered with yellow stinging hairs. The seeds are black with a yellow waxy aril. Rare, Bukit Timah, Chan Chu Kang, Kranji, Chua Chu Kang.

Colostegia Griffithii Benth. "Punggai." A very big tree with small flowers on the old wood and large round woody fruits, the outside, covered with thorns, is black, the inside brilliant orange. The bark is used in tanning. Rare, Bukit Timah, Garden Jungle.

Boschia Griffithii Mast. "Durian-Durian." A medium sized tree with small white flowers and little scarlet durians. Rare, Garden Jungle, Bukit Timah.

STERCULIACEÆ.

Sterculia macrophylla Vent. A big tree with large red pods. Rare, Reservoir Woods, Chan Chu Kang.

S. laris Wall. A shrub or small tree with green flowers and scarlet pods which split open into 3 to 5 lobes in the form of a star, and show the oblong blue-black seeds suspended all round the margin. Woods, common, Tanglin, Bukit Timah, Pulau Ubin, etc.

Var with very narrow leaves. Chan Chu Kang, Bukit Mandai, Bukit Timah.

S. rubiginosa Vent. A small or medium sized tree very showy in fruit, flowers pink. Common, Tanglin, Bukit Timah, etc.

S. parviflora Vent. Big tree, Garden Jungle.

S. scaphigera Wall. "Kembang Samangko." A very large tree, often over 100 feet tall. The fruit in the form of a long green boat containing an oblong seed at one end. When the seeds are put into water the outer coat swells up and becomes mucilaginous, and this mucilage is eaten with sugar in the morning to cool the blood. Rare, Bukit Mandai.

Tarrietia simplicifolia Mast. A vast tree. Not common, Dalvey Road, Bukit Timah.

Heritiera littoralis Dryand, "Dungun." Sea shores, common, Bajau, Kranji, Pulau Tekong.

H. sp. Lofty tree in jungles. Garden jungle. Apparently undescribed.

H. fomes Buch. Ham. Mangrove swamps. Kranji.

Pterospermum diversifolium Bl. A gigantic tree, Pulau Ubin.

Pt. Blumeanum Korth. "Bayur." A big tree, dense woods, common, Bukit Timah, Sungei Buluh.

Melochia corchorifolia L. A common weed with small pink flowers. Waste ground everywhere.

[*Pentapetes phoenicea* L. A tall herb with deep red flowers. Waste ground, Tanglin, Blakang Mati.]

Buttneria Maingayi Mast. "Akar Kachubong." A big woody climber with curious little white and pink flowers and round prickly capsules. Common, Garden Jungle, Changi, Bukit Mandai, etc.

B. Jackiana Wall. Singapore, King's Materials. Not seen, probably an error.

Commersonia platyphylla Andr. "Durian Tupai." A common tree with white flowers, in large cymes and bristly capsules. Open country Tanglin, Jurong, etc.

TILIACEÆ.

Brownlowia lanceolata Benth. Rare, "Mangroves, Kranji.

Pentace triptera Mast. "Sepa Petri." Medang Serai."
A gigantic tree with white flowers. Woods, common. Bukit Timah, Ang Mo Kio, Chua Chu Kang.

Grewia umbellata Roxb. A stout climber with white flowers. Common, Tanglin, Galang, etc.

G. fibrocarpa Mast. Small tree with orange fruits. Rare, Cluny Road

G. latifolia Mast. A large shrub with orange pear-shaped fruits about an inch long, and pleasantly flavoured. Flowers yellow. Tanglin, Bukit Timah, Chan Chu Kang.

The absence of the common peninsular shrub *G. paniculata* Roxb. is very remarkable.

Triumfetta rhomboidea Jacq. A common weed with small yellow flowers and prickly fruit. Waste ground, Tanglin, Changi, etc.

T. pilosa Roth. Singapore (King) not seen.

(*Corchorus capsularis* L. "Jute." Bukit Timah (Dr. King).

C. acutangulus Lam. Weed with yellow flowers, rare. Chan Chu Kang.

Echinocarpus sp. Tree with white flowers in axillary panicles. Very rare, Kranji (No. 6174).

Elaeocarpus. Trees with white flowers, often showy, and blue or green drupes. "Mendong."

E. ganitrus Roxb. Cultivated only. The globose oily blue fruits contain a hard tubercled seed much in request by Tamils as a bead. It is usually 5 grooved, but very rarely a 6 grooved one is found, which commands as high a price as 5 dollars.

E. parvifolius Wall. Common, Tanglin, Changi, etc.

E. stipularis Bl. Very common, Tanglin, etc.

E. salicifolius King. "Jurunong Padi." Not common, Bukit Timah, Selitar.

E. paniculatus Wall. Common. Kranji, Bukit Mandai, Selitar.

E. petiolatus Wall. Common, Tanglin, Selitar, Changi.

E. Griffithii Mast. Common, Tanglin, Selitar.

E. Hullettii King. Not common, Bukit Timah, Bukit Mandai.

E. pedunculatus Wall. Sea shores, Loyang, Toas, Jurong, Pulau Tekong.

E. apiculatus Mast. Rare. Bukit Timah Road.

E. polystachyus Wall. "Jurunong Babi." Flowers buff, common in woods, Bukit Timah, Jurong, Teban, Changi.

E. Jackianus Wall. Not rare, Tanglin, Selitar, Bukit Mandai.

E. Masterii King. Common, Tanglin, Bukit Timah, Kranji, Changi.

E. sp. near *E. polystachyus*. Rare, Bukit Timah (4949, 3641)

LINEÆ.

Roucheria Griffithiana Planch. Climber, with yellow flowers, and small red drupes. Common in thickets and woods. Tanglin, etc.

Erythroxylon burmanicum Griff. A tree. Common near the sea.

Ironanthes icosandra Jack. "Pagar Anak." Tree. Common, Tanglin, etc.

I. reticulata Jack. Less common, Woods, Garden Jungle, Bukit Timah, Bajau, Jurong.

MALPIGHIACEÆ.

Tristellateia australasica Rich. A slender climber, flowers yellow. Common by tidal rivers, and often cultivated. Toas, Kranji, Changi, Pulau Ubin.

Hiptage sericea Hook. fil. Scandent, but forming bushes in open sandy spots. Flowers pink and white. Rare, Changi, Bukit Mandai road.

Aspidopterys concava Juss. Climber, Forests, Bukit Mandai, Chan Chu Kang.

GERANIACEÆ.

(*Oxalis corniculata* L. A garden weed, common.)

(*Averrhoa Bilimbi* L. the Blimbing, and *A. Carambola* L. "Kembola," are cultivated.)

Connaropsis macrophylla King. Tree, flowers crimson. Not common, Selitar

RUTACEÆ.

A number of these are cultivated, among which are Rue (*Ruta graveolens*) the Kamuning (*Murraya exotica*) of the ornamental wood of which the sheaths and handles of Krises are made, the Lime berry, "Limau Keah" (*Triphasia trifoliolata*), the pumelo (*Citrus decumanus* L), orange (*Citrus aurantium*), various Limes (*Citrus medica* L.)

Evodia Roxburghiana Benth. "Stenga burong." A shrub with white flowers. Common in open country, Tanglin, Bedoh, Kranji, Jurong, Bukit Timah.

E. glabra Bl. A fine tree. Local, but not rare, Tanglin, Bukit Timah, Chan Chu Kang.

E. robusta Hook. fil. A tall tree. very conspicuous in flower. Not rare, Reservoir, Toas, Bukit Mandai.

E. pedunculosa Hook. fil.* A very little known plant, said to have been collected in Singapore by Lobb.

Zanthoxylum ovalifolium Wight. Wallich No. 7469, not seen.

Acronychia Porteri Hook. fil. A tree, usually small. Flowers and fruits green. Woods, common, Garden jungle, Bukit Timah, Changi, Jurong, Chan Chu Kang.

Glycosmis pentaphylla Corr. Common in woods and forests, a large shrub, flowers and fruits white. Garden jungle, Bukit Timah, Kranji, Selitar, etc: a broad leaved form. A narrow leaved one occurs at Changi.

Micromelum hirsutum Oliv. Wallich (No. 8156 c.) Not seen.

Clausena excavata Burm. A small tree with white flowers,

strongly scented foliage and semitransparent pink fruits. Doubtfully wild. Open country, Tanglin, Pulau Ubin.

Lucunga eleutheranthera Dalz. Climber, very rarely flowering. Changi, Bukit Timah.

Paramignya grandiflora Oliver. Very rare, Changi (Hullett); also collected by Lobb.

P. longispina Hook. fil. "Limau Lelang." A thorny shrub with curious pear-shaped orange aromatic fruits used in native medicine. Near mangrove swamps, Kranji, Jurong.

Simarubeæ.

Brucea sumatrana Roxb. A shrub with aromatic foliage small purple flowers and black berries. Wallich (No. 8482). I have never seen this here, but on introducing some plants from Pahang, it established itself all about Tanglin, the seeds being borne about by birds.

Eurycoma longifolia Jack. "Bidara Pahit." An elegant shrub with a very bitter bark used in medicine against fever. Common in dry woods, especially near the sea. Tanglin, Changi, Bukit Timah, Blakang Mati, etc.

Irvingia Malayana Oliver. "Pauh Kijang." A gigantic tree over 100 feet tall, with small green flowers, and fruit like mangoes, green with an orange pulp. Tanglin, Reservoir woods, Bajau, etc.

Ochnaceæ.

Gomphia sumatrana Jack. Tree, flowers yellow. Common. Bukit Timah, Kalang, Toas, Changi, Pulau Ubin.

G. Hookeri Planch. Flowers deep red. Less common, near the sea. Changi, Tanjong Gol, Bukit Timah.

Tetramerista glabra Miq. Wallich (No. 1055). Not seen.

Euthemis leucocarpa Jack. An under shrub, very elegant with white flowers, and rosy, scarlet or white berries. Common in sandy woods. Kranji, Changi.

E. minor Jack. Singapore, according to Jack. I have only found it at Pulau Battam, south of Singapore.

BURSERACEÆ.

Triomma malaccensis Griff. A big tree exuding a very aromatic turpentine, fruit green three-winged, containing three oval flat-winged seeds. Not common, Garden Jungle, Bukit Timah.

Canarium Planchoni King. Not common, Bukit Mandai.

C. grandiflorum Benn. Flowers orange. Rare, Changi (Hullett), Bukit Mandai.

C. pilosum Benn. "Kedondon Krut." Not common, Changi.

C. rufum Benn. "Kedondon Bulan." A medium sized tree with creamy yellow flowers and large hard glaucous green fruits tasting of turpentine, with a triquetrous seed. Not rare, Tanglin, Selitar.

C. purpurascens Benn. Not common, Bukit Timah, Changi, Chan Chu Kang.

C. Kadondon Benn. "Tinou." Big tree, fruit erect pink. Garden jungle, Bukit Timah, Changi.

C. secundum Benn. Not common, Changi Road, Tanglin, Selitar.

C. nitidum Benn. Open woods, common, Changi Reservoir woods, Bukit Timah.

Trigonochlamys Griffithii Hook. fil. "Kumpas Ruman." Tanjong Gol. Kranji, Selitar.

Santiria laxa King. A large tree with a spreading head. Flowers in lax hanging hairy panicles deep red. Drupes plum-like rosy. A beautiful tree when in fruit. Garden jungle, Bukit Timah.

S. laevigata Bl. "Kerantei." A large tree, flowers green. Not rare, Selitar, Garden jungle, Bukit Mandai.

S. apiculata Benn. Flowers greenish white, fruits rosy. Bajau, Bukit Timah.

S. multiflora Benn. Not common, Selitar.

MELIACEÆ.

Sandoricum radiatum King. "Kechapi." Cultivated for its fruit. Wild on Pulau Ubin in thick woods.

S. indicum Lam. "Sentol." Cultivated commonly.

Chisocheton pauciflorus King. Thick woods, not common, Bukit Timah.

Ch. erythrocarpus Hiern. Not common, Pulau Ubin.

Ch. macrophyllus King. Rare. A big tree, Pulau Ubin.

Ch. patens Bl. A big tree with long racemes of white flowers, very fœtid. Common, Garden jungle, Bidadari, Changi, Selitar.

Dysoxylum acutangulum Miq. A tree with large orange-colored pear-shaped fruits. Changi.

D. costulatum Miq. A large tree, flowers white. Not rare, Changi, Chan Chu Kang, Bukit Timah.

D. macrothyrsum Miq. Selitar.

D. cauliflorum Hiern. A medium sized tree with white flowers on the stem, scented of almonds, and red capsules, containing black seed with a red aril. Common in thick woods, Changi, Chan Chu Kang, Bukit Timah, Pulau Ubin.

D. turbinatum King. Rare, Bukit Timah (8108).

Amoora Aphanamixis Schultes. Not rare. Toas, Bukit Mandai, Selitar.

A. rubiginosa Hiern. A superb tree, over 100 feet high, the leaves of a copper color beneath, flowers rose. Jungles, Chan Chu Kang.

A. cucullata Roxb. Tree, flowers yellow. Selitar (3778, 4575).

A. rubescens Hiern. Singapore (Maingay), Selitar.

(*Aglaia odorata* Lour. Cultivated for its sweet flowers.)

A. oligophylla Miq. Singapore. Wallich (No. 4887). Not seen.

A. glabriflora Hiern. Small tree, leaves deep shining green, flowers and fruits white. Local. Garden Jungle, Changi.

A. odoratissima Bl. Tree, flowers yellow. Not rare, Bukit Mandai. Chan Chu Kang, Bukit Timah, Reservoir Woods.

A. cordata Hiern. Rare, Selitar.

A. tenuicaulis Hiern. Singapore (Lobb), perhaps an error.

A. trichostemon Dec. Rare. Garden Jungle.

(*Lansium domesticum Jack.* The Duku ; cultivated.)

Carapa obovata Bl. "Nireh." A big tree, with sweet white flowers and large globular fruits, with corky seeds. The bark is used in medicine for dysentery. Mangrove swamps, very common, Kranji, Serangoon, etc.

Chailletiaceæ.

Chailletia deflexifolia Turcz. A climbing or scrambling shrub, flowers white. Rare, Bajau.

Olacineæ.

Ochanostachys amentacea Oliver. "Petaling." A well known timber tree with leaves like those of a beech-tree, small spikes of green flowers, and green fruit with much white milk. Common. Garden Jungle, Changi, Reservoir woods.

Strombosia rotundifolia King. Woods, Bukit Timah, Garden jungle, Bukit Mandai.

Lepionurus sylvestris Bl. A small shrub, Garden jungle, Bidadari.

Ctenolophon parvifolius Oliver. Rare, Garden jungle.

Ximenia americana L. "Bidara Laut." A spiny shrub with white flowers and orange eatable drupes. The wood is scented. Sea coasts, Changi, Pulau Selitar, Jurong, Pasir Panjang.

Scorodocarpus borneensis Becc. "Kulim" A large timber tree with white flowers, all parts having a strong smell of onions. Common, Garden jungle, Bukit Timah.

Gomphandra penangiana Wall. A shrub common in woods. Bukit Timah, Garden jungle, Tanjong Katong, Selitar.

G. lanceolata Kurz. Not common, Bukit Timah.

Lasianthera secundiflora Miq. A large tree, flowers white. Rare, Bukit Mandai, Selitar.

Gonocaryum longeracemosum King. "Toioh." A large straggling shrub, with pendulous racemes of purplish green flowers; fruits green. Woods, not rare. Tanglin, Changi.

Phytocrene oblonga Wall. A large woody climber with dense racemes of small grey flowers growing on the stem, fruit wedge-shaped brown covered with brown bristles and forming a ball as big as a man's head. The seeds are cuneate oblong and curiously reticulated. Rare, Bukit Timah.

Ph. bracteata Wall. Common, open woods, Tanglin, Tanjong Katong, Bukit Panjang.

Iodes velutina King. Climber. Rare, Bukit Timah Road.

I. oblonga Planch. Not rare, Bidadari. Chan Chu Kang, Garden jungle.

Erythropalum scandens Bl. A slender climber with inconspicuous green flowers, and very curious and ornamental fruit, which at first is an oval drupe, but when ripe the husk becomes bright red and splits into 4 lobes, which recurve and expose a deep blue seed in the centre. Not common, woods, Bukit Mandai, Reservoir woods, Garden jungle.

Ptelocarpa malaccensis Oliver. A fair sized tree, flowers yellow, fruit round thin, winged. Rare, Changi woods.

Ilicineæ.

Ilex cymosa Bl. A small or medium sized tree with very white bark, more rarely a bush. Flowers very small and green. "Timah-Timah" or "Titimah." Common in open country, Tanglin, Changi, Chan Chu Kang.

I. macrophylla Wall. Usually a smaller plant with larger leaves. Common, Garden jungle, Ang Mo Kio, Changi, Kranji.

Celastrineæ.

Euonymus javanicus Bl. A large shrub. Woods, rare, Kranji, Sumbawang.

Glyptopetalum quadrangulare Prain. Not common, Changi beach, Chan Chu Kang.

Kokoona littoralis Laws. Singapore (Lobb). Not seen.

Lophopetalum fimbriatum Wight. "Krabu." A tree with yellow petals and the central disc purple. Rare, Bukit Mandai, Changi.

L. Curtisii King. A gigantic tree, rare. Bukit Mandai, Chua Chu Kang.

L. fuscescens Kurz.* Singapore. (Anderson.) Not seen.

Kurrimia pulcherrima Wall. A tall tree with small red flowers. Not common, Bukit Mandai, Gardens.

K. paniculata Wall. A large handsome tree with dark green leaves and panicles of small green flowers, with an unpleasant smell. Much frequented by flies. Fruit a heart-shaped red capsule. Common in dry woods, Tanglin, Chan Chu Kang, Bukit Mandai, etc.

Hippocratea indica L. A climber with very small white flowers. Local in sandy spots, Changi, Pulau Ubin.

H. Cumingi Laws. "Akar Bintang." Climber, flowers yellow. Sea coasts, Sungei Paudan, Kranji, Selitar.

Salacia grandiflora Kurz. "Ampedal Ayam." A shrub half scandent, gnarled, with black stems, small pearly flowers, and eatable orange coloured fruits. Woods and open country, Bukit Timah, Pulau Ubin, Changi, Toas.

Var. longifolia, Changi.

S. lutifolia Wall. Singapore (Wallich No. 4222). Not seen.

S. prinoides De C. A slender climber (a large straggling shrub according to King), with very small brown flowers and small globular orange fruits. Not common. Garden jungle, Bukit Timah Road, Pulau Ubin.

S. flavescens Kurz. A climber with yellow or reddish flowers. Not common, Bukit Timah, Tanglin, Changi.

S. longiflora Hook. Half scandent shrub with buff flowers. Changi, rare.

S. sp. near *flavescens*. Rare, Changi (4785).

S. Lobbii Laws.* "Singapore Lobb." Not seen, very imperfectly known.

Celastrus Championi Benth. var ? Sungei Loyang.

RHAMNEÆ.

Ventilago leiocarpa Benth. A slender much branched climber with small green flowers, and small round fruit with a long narrow wing. Common, Garden jungle, Bukit Timah, Pulau Ubin.

V. madraspatana Gaertn. Rare. Bukit Mandai.

Zizyphus oenoplia Mill. A scandent thorny bush. Not common. Orchard Road.

Z. elegans Wall. (Wallich No. 4233). Not seen.

Z. calophylla Wall. A large climber very thorny dark green polished leaves, small white flowers and orange globose eatable fruit. Very common, Garden jungle, Bukit Timah, Selitar, etc.
Var. with small leaves, and smaller fruits. Selitar.

Z. Horsfieldi Miq. Rare, Bukit Timah.

Colubrina asiatica Brongn. A shrub with green flowers. Sea coasts, Galang.

Smythea reticulata King. Climber. Not common, near the sea. Toas, Serangoon.

AMPELIDEÆ.

Vitis macrostachya Miq. Hedges, common, Tanglin, Bukit Timah, Jurong.

V. gracilis Wall. Very common, Changi, Reservoir, Tanglin, Selitar, etc.

V. cinnamomea Wall. Not very common, Chan Chu Kang, Reservoir, Bukit Mandai.

V. polythyrsa Miq. Rare, Changi,

V. elegans Kurz. Hedges and borders of woods. Very common, Tanglin, Jurong, etc.

V. Lawsoni King. A big climber with large yellow grapes quite eatable. Woods, Bukit Timah, Garden jungle.

(*V. quadrangularis* Wall. An odd four-angled stemmed vine, with very few leaves; not native, but cultivated here and there.)

V. furcata Laws. A long vine with flat stems 4 angled green with thick bands of brown cork along the edge, grapes black. Common in dense woods, Bukit Timah, Bukit Mandai, Tanglin, etc.

V. repens W. and Arn. Hedges, Fort Canning, Chan Chu Kang.

V. cerasiformis Teysm. Bukit Timah.

V. glaberrima Wall. A succulent vine with grey four angled stems and red tendrils, berries black. Very common in hedges. "Asam Riang". Tanglin, Changi, etc.

V. mollissima Wall. "Lakom Gajah." A hairy vine with trifoliolate leaves and large dirty white grapes. Common, Cluny Road, Sungei Buluh, Reservoir woods.

V. trifolia L. Very common, hedges, Reservoir, Race Course, Kalang Puding.

V. Japonica Thunb. "Singapore." Not recognised.

V. novemfolia Wall. A slender vine with large semitransparent pink grapes, quite uneatable. Common, Tanglin, Chua Chu Kang.

V. sp. Leaves simple, flowers very small green in axillary panicles, crowded at the ends of the branches. Rare, Selitar.

Pterisanthes coriacea Korth. A very slender vine remarkable for its long flattened crimson flower spikes 3 or 4 inches long one or 2 wide; female flowers small sunk in the spike, males on stalks along the edge, grapes black. Local in thick woods, Chan Chu Kang, Bukit Mandai, etc.

Leea. Large shrubs with green or red flowers in corymbs. "Malli-malli".

L. sambucina Willd. Six to ten feet tall, flowers greenish white. Very common in damp spots. Tanglin, Bukit Timah, Selitar.
Var. *biserrata.* Chua Chu Kang.

L. robusta Roxb. Rare, Blakang Mati.

L. rubra Bl. A smaller plant with red flowers, very pretty. Tanglin, perhaps introduced.

L. Javanica Bl. Singapore (Schomburgk). Not seen.

L. angulata Korth. "Malli biduri." Passir Panjang.

SAPINDACEÆ.

Cardiospermum Halicacabum L. the Balloon vine, is cultivated by the Chinese as a vegetable, and occurs in waste ground. Pulau Ubin, Rochore.

Allophylus Cobbe L. A sea shore shrub with white flowers and red berries. The var. *racemosa* is the only one here. Common, Kranji, Selitar, Jurong. Alexandra Road.

Erioglossum edule Bl. "Mertajam." A tree, with small black unpleasantly flavoured fruits. Common, especially near town. Government Hill, Pulau Ubin.

Xerospermum muricatum Radlk. "Rambutan Pachat." A small tree, flowers white, fruit yellow roughened outside, seed enclosed in eatable pulp. Common, Tanglin, Bukit Mandai, Bukit Arang.

X. Wallichii King. Singapore, Wallich (not seen).

Nephelium lappaceum L. "Rambutan." *N. Longana* Camb.; "Mata Kuching:" *N. chryseum* Bl. "Pulassan," are cultivated.

N. glabrum Noronha. "Redan." Fruits warted red, acid. Tanglin, Chan Chu Kang, Toas.

N. rufescens Hiern. Chan Chu Kang.

N. eriopetalum Miq. A beautiful tree with white flowers in hanging spikes, and scarlet fruit like rambutans. "Sunggol Lotong." Bukit Timah, Garden Jungle.

Pometia gracilis King. Woods, Bukit Timah.

P. alnifolia Radlk. Chan Chu Kang, Bukit Mandai.

Guioa pleuropteris Radl. Tree, flowers white. "Simpayan Ular." Common, Bentley's hill (Hullett), Bukit Timah, Selitar.

G. squamosa Radl. Bukit Timah, Selitar.

G. pubescens Radl. Very common everywhere.

Trigonachras acuta Radl. Rare, Bukit Timah.

Arytera littoralis Bl. var. *Major*. A shrub or small tree. Seacoasts, Chua Chu Kang.

Mischocarpus fuscescens Bl. Bukit Panjang, Pulau Ubin.

M. sundaicus Bl. Tampenis, Serangoon, Changi.

Paranephelium macrophyllum King. Very large tree, with pink flowers, fruit woody covered with processes, brown dehiscing. Bukit Timah.

Turpinia pomifera De C. "Geritta." Medium sized tree, flowers and fruits green. Woods, Bukit Timah, Tanglin, Bukit Mandai.

SABIACEÆ.

Meliosma elliptica Hook. fil. Tree, rare. Chan Chu Kang.

M. lanceolata Bl. Small tree, not rare. Chan Chu Kang, Jurong, Bukit Mandai

M. Ridleyi King. Common, Garden jungle, Bukit Timah. It also occurs in Johore, near Castlewood.

ANACARDIACEÆ.

Buchanania florida Schauwer var. *lucida*. "Otak Hudang." Tree with white flowers. Common in open country and low woods, Tanglin, Changi, Kranji. Var. *petiolaris* not common, Selitar.

B. sessilifolia Bl. Common, Chan Chu Kang, Jurong, Tampenis'

Bouea burmanica Griff. "Ruminiya." A big tree with small acid orange mangos, common, wild and cultivated.

(*B. macrophylla* Griff. "Kedondong." Cultivated as a fruit tree.)

Mangifera sclerophylla Hook. fil. A gigantic tree. Rare, Bukit Timah, Changi.

M. odorata Griff. "Kohini." Bukit Timah, Toas; perhaps only cultivated.

(*M. foetida* Lour. "Bachang." Cultivated.)

M. lagenifera Griff. "Lanjoot." A magnificent tree, with purple

flowers and large grey pear shaped mangoes, very unpleasant to eat. Jurong, Blakang Mati, etc. Cultivated.

M. kemanga Bl. "Kemang." Probably only cultivated, rare.

M. indica L. "Mango." Cultivated.

Anacardium occidentale L. Cashew. "Gajus." Cultivated and often established. Common near the sea.

Melanorrhœa Maingayi Hook. fil. "Rengas Manau." A big tree with white flowers, and red 5-winged fruit. A well known timber. Common, Bukit Timah, Changi, Kranji, Selitar.

Parishia pubescens Hook. fil. A lofty tree, 150 feet tall, flowering before the leaves come out, flowers white. Very rare, Dalvey Road.

P. paucijuga Engler. Rare, Bukit Timah.

P. Maingayi Hook. fil. Garden jungle.

Campnosperma Griffithii Hook. fil. "Teruntang." A large tree, with big leaves especially when young. Common, Bukit Timah.

C. auriculata Hook. fil. Common in woods. Tanglin, Bukit Timah, Selitar, Teban.

C. Wallichii King. Dalvey Road, Bukit Mandai, Toas.

Melanochyla auriculata Hook. fil. A big tree, with very large stiff leaves and panicles of green flowers fertilized in the evening by brown cockchafers. Wet jungles, Chan Chu Kang.

Dracontomelum mangiferum Bl. Rare, Chua Chu Kang.

CONNARACEÆ.

Connarus ferrugineus Jack. A scandent shrub. Not common, Bukit Mandai.

C. semidecandrus Jack. A half scandent bush with lilac flowers, and red pods containing one black seed with a red aril. Dry open country, Toas, Changi, Selitar, Bukit Mandai.

C. oligophyllus Wall. Bukit Mandai, Changi.

C. grandis Jack. Local. Changi, Pulau Ubin.

C. ellipticus King. Bukit Mandai.

Ellipanthus Griffithii Hook. fil. A tree with small white flowers Garden jungle.

Rourea acuminata Hook. fil. Singapore, Wallich (8533). Not seen.

R. pulchella Planch. Lofty climber. Garden jungle, Changi.

R. rugosa Planch. "Semilat putih." Common, Changi Road, Selitar.

R. parallela Planch. Sungei Buluh, Changi, Kranji.

R. fulgens Planch. "Semilat." A tall slender climber with pink and white flowers. The young leaves of a beautiful pink, whence the specific name. A very beautiful plant. The bark is used by natives for colic. Very common, Tanglin, Bukit Timah, Teban.

R. concolor Bl. Not rare. Teban, Reservoir Woods, Chan Chu Kang.

Agelæa vestita Hook. fil. "Akar Kachang-kachang." A climber with small pinkish flowers and red velvety pods. Common in forests, Tanglin, Sumbawang, Bukit Timah, Changi.

A. Wallichii Hook. fil. "Akar Kachang jantan." Changi.

A. Hullettii King. Local, Changi.

Cnestis ramiflora Griff. A climber with brilliant pink shoots, white flowers, and large pear-shaped red fruits. Common in dry woods and open country. Tanglin, Changi, Tanjong Penjuru.

LEGUMINOSÆ.

Abrus precatorius L. A slender climber with pale lilac flowers and red and black seeds. A variety with white seeds occurs and is highly prized by the natives as a medicine. Sea shores, Changi.

Crotalaria alata Ham. "Kachang Hantu Darat." A herb with yellow flowers. Local waste ground, Tanglin, Changi, Jurong, Ang Mo Kio.

C. retusa L. A glaucous herb with showy orange yellow flowers. Sandy shores, Changi.

C. Saltiana And. A common weed in waste ground, and sandy-places, yellow flowers. Changi, Galang, etc.

C. quinquefolia L. Rare, Kranji.

C. incana L. Flowers yellow. Sea shore, Tanah Merah.

Flemingia strobilifera Br. A shrub. Sea shores, not common, Changi, Blakang Mati.

Vigna retusa Walp. A small yellow vetch. Sea shores, Changi, Blakang Mati.

(*V. Catiang* End. "Kachang Perut Ayam." Cultivated.)

(*Pachyrrhizus angulatus* Rich. "Bengkuang." "Sengkuang." The yam bean is cultivated.)

(*Dolichos Lablab* L. "Karkaras". Flowers blue or white, cultivated.)

Psophocarpus tetragonolobus De C. "Kachang Botor." Cultivated.)

(*Clitorea Ternatea* L. Cultivated.)

C. cajanifolia Benth. A shrub with large lilac white flowers, naturalised from Brazil, round Tanglin, etc. Very common.

Centrosema Plumieri Benth. The "Butterfly pea," climber, flowers white with dark crimson centre. Naturalised in hedges near town.

(*Canavalia ensiformis* De C. "Kachang Parang." Cultivated.)

C. lineata De C. A creeping bean with pink flowers sweet-scented, beans eatable. Sea shores, common, Changi, Blakang Mati.

C. obtusifolia De C. A climber on bushes, flowers pink. Beans said to be poisonous. Sea shores, Toas, Changi.

Mucuna gigantea De C. Climber, flowers greenish white. Not common, Blakang Mati.

M. biplicata Teysm. Flowers purple. Chan Chu Kang.

(*Erythrina stricta* and *E. lithosperma* Miq. are planted here and there, but not wild.)

Spatholobus ferrugineus Benth. "Akar Sejangat." A big liana, one of the best of the water vines, climbing to the tops of the highest trees, flowers deep purplish small. Common, Tanglin, Chan Chu Kang, etc.

S. Maingayi Prain. Flowers rosy. Woods, Bukit Timah, Garden jungle.

S. Ridleyi Prain. * Big climber, flowers white. Gardens, Chan Chu Kang.

Indigofera hirsuta L. Sea shore, Teluk Kurau.

Sesbania paludosa Roxb. Rare. Marsh near Kranji.

(*S. grandiflora* Pers. Tree with large white or pink flowers. Cultivated for its flowers, and for the leaves eaten as a vegetable.)

(*Tephrosia candida* De C. given for Singapore in the "Materials," is only a garden plant.)

T. Hookeriana W. & A. Waste ground, Bidadari, probably an escape.

Millettia eriantha Benth. A lofty climber with coppery red flowers with a greenish yellow centre to the standard, outside covered with golden fur. Not very common. Bukit Mandai, Garden jungle.

M. Maingayi Bak. A big climber with large hanging panicles of pink flowers deliciously scented. Pods oblong woody, about 4 inches long, one seeded, wrinkled and covered with fine grey fur. Not common, Tanglin, Chan Chu Kang, Reservoir woods.

M. atropurpurea Benth, is probably not wild here. A fine tree occurs in a garden in Paterson Road.

Pongamia glabra Vent. "Malapari." A tree with pink flowers. Common on the sea coasts. Changi, Siglap, Jurong, Pulau Ubin.

Derris sinuata Thw. Woody climber, flowers green and white. Tidal rivers, Pulau Ubin.

D. thyrsiflora Benth. Scandent bush, flowers in dense erect panicles, white, pods long and thin, reddish when white. Very common in open country, Tanglin, Changi, etc.

D. uliginosa Benth. "Akar Ketuil". Scandent shrub, flowers pink. Common on sea coasts and by tidal rivers Rivers Valley Road, Changi, Pulau Ubin, Kranji, Bajau.

D. scandens Benth. Flowers white. Pulau Merambong.

D. amœna Benth. Climber, flowers pink. Not common, Garden Jungle.

(*D. elliptica* Benth. "Tuba." Often cultivated for killing insects on vegetables, and catching fish).

D. Malaccensis Prain. Flowers pink. Jurong, Selitar.

D. oblongi Benth. Flowers dark pink. Changi (No. 6086).

D. sp. with very velvety leaves. Rare, Chan Chu Kang, Changi (6087).

Kunstleria Ridleyi Prain.* Big climber, flowers small purple almost black. Woods, common but rarely flowering. Garden jungle, Selitar.

Dalbergia Junghuhnii. Benth. A woody climber with small

greenish white flowers. Woods common, Tanglin, Changi, Pulau Ubin, Sumbawang.

Var. *Scortechinii*. Bukit Timah (6406).

D. velutina Benth. Rare, Changi.

D. pseudosisso Miq. Climber, flowers white. Common, Garden jungle, Bukit Mandai, Changi, Selitar, Bajau.

D. Hullettii Prain. Flowers white produced when the leaves are fallen. Rare, Thomson Road, Selitar.

D. torta Grah. Climber, flowers white. Mangroves and sea shores. Common, Pulau Ubin, Kranji, Pulau Damar.

Pterocarpus indicus Willd. The Angsana, or Sena, planted only.

Zornia diphylla Pers. Prostrate herb, flowers yellow. Sandy places, Galang, Changi.

Uraria crinita Desv. Small shrubby plant with a tall spike of blue flowers, very beautiful; on banks sporadically. Orchard Road, Scott's Road.

Alysicarpus vaginalis Miq. A slender herb, flowers black purple. Changi, Teluk Kurau.

Var. *nummulariifolia* Pulau Ubin (Kunstler).

Æschynomene indica L. Shrubby weed, Galang.

Desmodium triflorum De C. Prostrate herb in grass, flowers pink. Common, Tanglin, Changi.

D. heterophyllum De C. Common over the whole island.

D. umbellatum De C. A big shrub, flowers white. Sea coasts all round the island.

D. polycarpum De C. A shrubby plant with erect racemes of deep crimson, or rarely white flowers. Common in open country, Tanglin, Changi, Selitar, etc.

Var. *ovalifolia*. Rare, Ang Mo Kio.

Ormosia macrodisca Bak. A big tree, flowers pink, pod round and flat reddish pink with a large scarlet and black seed. Rare, one tree in Cluny Road.

O. parrifolia Bak. Not a very large tree, leaves small deep green, flowers white, pod round, seed red. Not rare. Blakang Mati, Changi, Pasir Panjang, Reservoir.

O. microsperma Bak. Var. *Ridleyi*. Tree about 50 feet tall, flowers white. Rare, Selitar, Tanglin.

Cassia obtusifolia L. A common weed with yellow flowers. Waste ground, Tanglin, Galang.

C. hirsuta L. A hairy weed with yellow flowers. Common, Tanglin, etc.

C. occidentalis L. A common weed.

C. alata L. "Gelenggang, Daun Kurap." Shrub with showy yellow flowers. Common round villages.

C. siamea Lam. Tree, yellow flowers. Occurs near Tanglin, but doubtfully wild in Singapore.

C. Leschenaultiana De C. A pretty shrublet with yellow flowers. Common round Tanglin, Bukit Mandai.

Kumpassia malaccensis Maing. "Kumpas." A gigantic tree with hard red wood. Common all over Singapore.

Dialium laurinum Bak. Kranji, Bukit Timah.

D. Maingayi Bak. Bukit Timah.

D. Wallichii Prain. Common, Garden jungle, etc.

The Dialiums are big trees, which supply the well known timber "Kranji." The fruit, a velvety black pod filled with a sweet pith enclosing a single seed, is eaten by natives and sold in the shops.

Bauhinia purpurea L. is quoted in books for Singapore, but is only in cultivation.

B. semibifida Roxb. Climber with white flowers. Common, Bukit Timah, Bukit Mandai, etc.

Cynometra cauliflora L. "Nam-nam." Cultivated

C. ramiflora L. var *heterophylla*. Shrub. Rare, river banks, Sungei Jurong.

Sindora Wallichiana Benth. "Saputi." A very fine tree, with green flowers. The calyx is covered with soft processes, not firm prickles as has been described. The flowers are fertilized by flies, which visit them in such quantity that I have heard the roar of their wings from the base of a very lofty tree, when in flower. The pods are flat, usually one seeded and covered with prickles which exude a gum. Garden jungle, Changi, Dalvey Road.

S. intermedia Bak. Changi, Blakang Mati.

Afzelia retusa Kurz. A small tree, flowers white; sea coasts, common, Bajau, Changi, Pulau Ubin. Selitar, Serangoon.

Peltophorum ferrugineum Benth. "Batai." A handsome tree with yellow flowers. Rare, Changi.

Cesalpinia nuga Ait. Thorny climber, flowers yellow. Sea shores Changi, Selitar.

C. tortuosa Roxb. Rare, Selitar.

Mezoneuron sumatranum W. and Arn. A very thorny climber with erect racemes of tubular flame-coloured flowers and thin flat pods bright red. Either in fruit or flower, this is a most beautiful plant. Not very common. Along the Bukit Timah Road. Sungei Jurong.

Parkia speciosa Hassk. "Petai." A tree with pear-shaped heads of small yellowish flowers on long hanging peduncles, and flat green pods, eaten by the Malays. Common wild and also planted. Bukit Timah, Bajau, Changi. Selitar, etc.

Entada spiralis Ridl. Woody climber with curious curled pods and very large brown subtriangular seeds. Common all over Singapore.

Adenanthera pavonina L. "Saga." Commonly planted and perhaps wild.

A. bicolor Moon. A more compact tree than "Saga," the seeds half red and half black. Bukit Timah, Bukit Mandai, Bedoh, Pasir Panjang, etc.

Neptunia oleracea Lour. The water-sensitive plant, a floating plant with bright yellow flowers Cultivated as a vegetable and formerly very abundant in Singapore, now rather uncommon.

Xylia dolabriformis Benth. "Singapore Wallich No. 5279." This has never again been found in the peninsula, and is probably wrongly localised.

Leucæna glauca Benth. Occurs near villages, doubtless planted.

Mimosa pudica L. The sensitive plant, is a well known pest over the whole island.

M. sepiaria Benth. An introduced shrub very common along the Bukit Timah Road, Dalvey Road, and near the Reservoir.

Acacia pseudo-intsia Miq. A scrambling thorny shrub. Not rare, Bukit Mandai, Changi, Toas, Chan Chu Kang.

A. pennata Willd. A thorny climber, climbing very high. Tanglin, hedges and thickets.

Serianthes grandiflora Benth. Singapore (Wallich). Not seen.

Albizzia littoralis Teysm. A tree with pink heads of flowers. Rare, Pulau Ubin.

A. pedicellata Bak. Rare, Kranji Road.

A. lucida Benth. Singapore *fide* Baker, possibly from a cultivated specimen.

A. odoratissima Benth. *A. Lebbek* Benth. *A. moluccana*, some-

times planted, establish themselves in many places.

Pithecolobium dulce Benth. Cultivated only.

P. confertum Benth. A tree, rare, Bedoh, Selitar.

P. bubalinum Benth. Rather rare, Tanglin.

P. lobatum Benth. "Jering." Tree with fœtid pods, very popular with Malays. Common over the whole island.

P. microcarpum Benth. A common little tree with white flowers and bright orange curly pods, very pretty when in fruit. Tanglin, Chan Chu Kang, Bukit Timah, etc.

P. ellipticum Hassk. "Jering hutan." A large tree with big curled orange pods from which when ripe hang black seeds covered with a grey bloom. Not rare, Selitar, Pulau Ubin.

P. contortum Mart. Common, Tanglin, Changi, Selitar, etc.

P. clypearia Benth. Common, Selitar, etc.

P. angulatum Benth. Very common in open country, woods, etc. Tanglin, Changi, Chan Chu Kang, etc.

ROSACEÆ.

Parinarium costatum Bl. A big tree with white flowers and hard brown drupes with white dots. Rare, Chan Chu Kang.

P. oblongifolium Hook. fil. "Balau." A well known timber tree of great size with large leaves white beneath. Rare, Bukit Timah, Bukit Mandai.

P. Griffithianum Benth. A big tree with deep green leaves, corymbs of white flowers and yellow plum-like fruits. Local, Fort Canning, Changi.

P. nitidum Hook. fil. "Kelat Layu hutan." A medium sized tree with very small red eatable plums. Bukit Mandai Chan Chu Kang.

Parastemon urophyllum De C. Sandy places near the sea, Changi, Chan Chu Kang.

Pygeum Maingayi Hook. fil. Tree with white flowers clustered on the branches. Not common, Cluny Road.

P. lanceolatum Hook. fil. "Singapore Lobb." Doubtless an error for Penang.

P. polystachyum Hook. fil. A fair sized tree, flowers whitish, scent of almonds. Common, Tanglin, Bukit Timah.

P. persimile Kurz. Rare, Kranji Road.

Rubus Moluccanus L. The common wild raspberry, fruit red small and very poor. Thickets over the whole island, very common.

R. glomeratus Bl. I doubt this than a variety, it has a longer terminal panicle and more entire leaves, and usually replaces typical *R. Moluccanus* in the hills; I have gathered it howevef in Jurong.

SAXIFRAGACEÆ.

Polyosma fragrans Benn. Wallich No. 8472. Not seen.

P. Ridleyi King. * Tree with white flowers. Rare, Selitar.

RHIZOPHOREÆ.

Rhizophora mucronata Lam. "Belukup." A common mangrove used for firewood. All mangrove swamps. Jurong, Bajau, Changi.

R. conjugata L. "Akit." Common, Bajau, Jurong, Selitar.

Ceriops Candolleana Arn. "Tengah." Common. Bark used in dyeing either a red brown when used alone, or purple or black in combination with Indigo.

Bruguiera eriopetala W. and A. Common, Bakau, Kranji, Jurong.

B. gymnorhiza Lam. Common, Jurong, Changi, Sungei Miora.

B. caryophylloides Bl. "Bakau Putih." Very common, River Valley Road, Selitar, Serangoon, Jurong, Pulau Ubin.

B. parviflora W. & A. "Lenggadi." Common, Serangoon, Jurong.

Carallia Scortechinii King. Tree, rare, Changi.

Pellacalyx axillaris Korth. Tree, common in secondary growth. Bukit Timah, Tanglin, Chan Chu Kang.

P. Saccardianus Scort. Tree. Common in woods, Bukit Timah.

Gynotroches axillaris Miq. "Mata Keli." Tree with whorls of small greenish flowers, and very small red or black berries; very common in secondary jungle and woods, all over the whole island.

Anisophylleia disticha Baill. An elegant shrub with pendulous branches and distichous leaves. Common in woods, Tanglin, Changi, Selitar, etc.

A. Griffithii Oliver. Rare, Chan Chu Kang.

COMBRETACEÆ.

Terminalia phellocarpa King. "Mampelam Babi." A tree with small white flowers and large green fruit. Not rare in damp spots in woods, Bukit Mandai, Holland road, Bukit Panjang, Chan Chu Kang.

T. Catappa L. "Ketapang." Common along the coasts, and often planted along road sides.

T. subspathulata King. A very large tree with winged fruits. Near the Garden jungle, Bukit Timah Road.

Calycopteris floribunda Lam. "Singapore Lobb." Doubtless an error for Penang.

Lumnitzera coccinea W. & A. Tree with panicles of scarlet flowers. Common near the sea. Bajau, Serangoon, etc.

L. racemosa Willd. Flowers white, Jurong.

Combretum trifoliatum Vent. I have found fruits of this floating in the sea near Singapore.

C. sundaicum Miq. Climber, flowers green, Changi, Chan Chu Kang.

Illigera appendiculata Bl. Climber, rare, Bukit Timah.

MYRTACEÆ.

Melaleuca leucadendron L. "Gelam." Wild at Tanah Merah, near Changi. Kampong Gelam may perhaps take its name from trees formerly growing here.

Tristania Whitiana Griff. in Cantor's Plants. Journ. As. Soc. Bengal xxiii. p. 623. *T. Wightiana* Griff. Mss according to Flor. Brit. India, but Griffith named it after a clergyman of the name of White. "Pulawan." A tree 40 feet tall with red bark which flakes off and lies in piles at the foot of the tree: flowers white, fœtid. Sandy spots near the sea, Bajau, Pulau Ubin.

T. sp. flowers small white, leaves more coriaceous. Woods, Bukit Timah, Bukit Mandai.

T. Merguensis Griff. Sungei Morai.

(*T. rufescens* Pierre. A shrub much resembling *Sideroxylon ferrugineum*, apparently this Cochin Chinese plant occurs on cliffs of the island Pulau Battam, South of Singapore.)

Rhodamnia trinerva Bl. A medium-sized tree with white flowers, often as white as Hawthorn when in flower; berries red turning black. Very common all over Singapore. The var. *concolor* with leaves green on both surfaces grows in shady places; var. *spectabilis* with the backs of the leaves silvery is common in open country, but the two varieties pass into each other and are often indistinguishable.

Rhodomyrtus tomentosa Wight. "Kamunting." A bush with rosy or white flowers, fruits plum-colored, eatable. Abundant in sandy spots. Mt. Faber, Blakang Mati, Changi.

Decaspermum paniculatum Kurz. A shrub or small tree, flowers white. Common in thickets and woods. Bukit Timah, Bukit Mandai, Jurong, Chan Chu Kang.

Eugenia. This genus of trees, probably the largest one known, is a very difficult one, and the identification of many of the species in this list must be somewhat doubtful at present. All in Singapore are trees of no very great size, with white, pink or rarely green flowers. Those with large flowers and fruits are usually known as Jambu, by the Malays, those with smaller flowers, as Kelat.

(*E.* (Sect. *Jambosa*) *Malaccensis* L. "Jambu Bol." Flowers large brilliant pink, fruit large white or pink, eatable. Cultivated.)

(*E. aquea* Burm. "Jambu Ayer Mawar." Flowers white, fruit semitransparent rose or white, eaten. Cultivated).

(*E. Jambos* L. Flowers white. Cultivated).

E. densiflora De C. Flowers pink, fruit globular pinkish, not rare, Changi, Siglap, Bukit Mandai, Bukit Timah road.

E. grandis Wight. "Jambu Ayer Laut." "Krian." Common on the sea coast and planted along the roads. A big tree flowers white. Wild, at Bajau, Changi.

E. lepidocarpa Wight. "Samak Tebrau." Big tree, flowers white; bark used for tanning nets. Common on the sea coast and inland. Tanglin, Bajau, Kranji, Changi.

E. filiformis Wall. "Kelat Lapis." Small tree with small white flowers on long pedicels, common in woods. Garden Jungle, Changi, Selitar, Tanjong Gol.

E. inophylla Roxb. "Samak Paya." Chan Chu Kang.

E. pendens Duthie. Dense woods, Bukit Timah.

E. Helferi Duthie. "Singapore Lobb." Not seen; probably from Penang.

E. (*Syzygium*) *cymosa* Lam. "Kelat Merah." Small tree, flowers

white. Bentley's Hill (Hullett), Changi, Teban, Pulau Tekong.

E. myrtifolia Roxb. River banks and near the sea. Sungei Morai, Selitar, Sungei Jurong.

E. acuminatissima Kurz. A big tree, flowers white, fruit purple. Garden Jungle, Jurong.

E. clariflora Roxb. and *E. leptantha* Wight. "Singapore and Penang, Wallich." Not seen; probably both from Penang.

E. zeylanica Wight. "Kelat Nasi-Nasi." Small tree, flowers and fruits white. Dry sandy spots, usually near the sea. Common, Tanglin, Changi, Toas, Kranji.

E. chlorantha Duthie. A very handsome tree with bright pink flowers. The name is a very unfortunate one, the petals are greenish white but very inconspicuous beside the brilliant red stamens. Cluny road, Bukit Timah, Tanjong Gol.

E. lineata Bl. One of our commonest trees in open country, flowers and fruits copious white. Tanglin, etc. whole island.

E. pyrifolia Wall. Cluny road, Changi.

E. Thwaitesii Roxb. Garden Jungle.

E. scoparia Wall. Singapore (Wallich 2594, not identified).

E. ramulosa Wall. Not common, Tampenis, Bukit Mandai.

E. oblongifolia Duthie. Garden Jungle, Chan Chu Kang.

E. subdecussata Wall. "Samak Pulut." Garden jungle, Changi. Toas.

E. oblata Roxb. Chan Chu Kang.

E. papillosa Duthie. Big tree with red flaky bark. Wet jungles common, Cluny road, Bukit Timah, Bukit Mandai.

E. bracteolata. Garden Jungle.

E. laevicaulis Duthie. Pulau Ubin.

E. anisosepala Duthie. Shrub near sea shore. Pulau Ubin (Hullett).

E. microcalyx Duthie. Bukit Timah.

E. Griffithii Duthie. Woods, Changi, Selitar, Garden Jungle, Bukit Timah.

E. nitida Duthie. Small tree, flowers pink. Ang Mo Kio, Bukit Mandai, Bukit Timah.

E. conglomerata Duthie. Big tree. Garden Jungle.

(*E. Jambolana* Lam. "Jiwat." Planted here and there.)
And a considerable number of undetermined species.

Barringtonia speciosa Forst. Sea coasts, Changi, Pulau Tekong, Beach road.

B. inclyta (Miers). "Putat." Sea shores, Kranji, Blakang Mati, Galang. This is certainly distinct from *B. racemosa* of the Bot. Mag. t. 3831, to which it is referred in the Flora of British India.

B. conoidea Griff. A large shrub, tidal rivers, Selitar.

B. cylindrostachya Griff. Shrub with very long racemes of pink on white flowers. Sandy woods. Toas, Changi, Pulau Tekong, Macpherson Road.

B. pendulum (Miers). Rare, Bajau.

Careya n. sp. A huge tree with large flowers, petals white, stamens white with pink bases. Leaves oblong obtuse coriaceous. Fruit like an apple with grey brown seeds and a strong coarse odour. Rare and seldom flowering. Garden Jungle.

MELASTOMACEÆ.

Melastoma polyanthum Bl. "Senduduk." Singapore Rhododendron. A very common shrub, open country everywhere.

M. molle Wall. Singapore Wallich, No 4046; otherwise only known from the Philippines.

M. decemfidum Jack. Singapore, Wallich. (Evidently an error for Penang.)

Ochthocharis javanica Bl. Shrub with pinkish flowers. Common in mangrove swamps. Kranji, Chan Chu Kang, Jurong, Pulau Ubin.

O. borneensis Cogn. Rare, tidal rivers, Selitar.

O. paniculata Korth. Singapore, Wallich, 4083. (Not seen).

Sonerila heterophylla Herb. Dense woods, Chan Chu Kang, Bukit Timah.

S. moluccana Roxb. Dense woods, Chan Chu Kang.

S. obliqua Korth. Herb, leaves dark green spotted with white when young, flowers rosy. Rocks and dead trees in forests. Common, Bukit Timah.

Maruma pholcarpa Jack. A climber with large handsome flowers white with a purple eye. Common, Tanglin, Jurong, Bukit Timah, Choa Chu Kang, Selitar.

Dissochaeta punctulata Hook. fil. Climber. Bukit Timah, Bukit Mandai, Selitar.

D. pallida Bl. Climber, flowers rose colored. Not common, Reservoir woods, Bukit Mandai.

D. annulata Hook. fil. Woods, Bukit Timah, Bukit Mandai. Selitar.

D. gracilis Bl. Slender climber, flowers white. Bukit Mandai, Bukit Timah, Pulau Ubin.

D. celebica Bl. Common, Bukit Timah, Reservoir woods, Selitar, Chan Chu Kang.

D. intermedia Bl. Rare, Bukit Mandai.

Anplectrum glaucum Triana. A fine climber with rosy flowers. Woods. Garden jungle, Bukit Timah. Reservoir, Selitar.

A. annulata Triana. Rare, Pulau Ubin.

Medinilla Hasseltii Bl. Epiphyte with pink flowers and scarlet berries. Common in mangroves and damp woods, Kranji, Bajau, Bukit Mandai, Choa Chu Kang.

M. macrocarpa Bl. Rare, Bukit Mandai.

Medinillopsis sessiliflora Cogn. Epiphyte, with waxy pink flowers. Mangrove swamps, common, Toas, Selitar, Kranji, Sungei Buloh.

Pachycentria macrorrhiza Becc. Epiphyte with swollen stem, flowers pink. Not rare, Selitar, Sungei Morai.

P. glauca Triana. Epiphytic, forming large tufts on trees in woods. Common, Bukit Timah road, Bukit Mandai, Kranji Sungei Buloh, Choa, Chu Kang.

These two Pachycentrias are classed by Beccari as ant-plants (Piante hospitatrici), but the ants do not live in the swollen stems as suggested by him, the swollen portions being quite solid.

Pogonanthera reflexa Bl. Epiphyte, more rarely terrestrial, usually near the sea, Kranji, Changi, Selitar, Toas, Bukit Timah.

(*Clidemia hirta* Don. A coarse weed, native of South America, has established itself in Tanglin, near Fort Canning and elsewhere.)

Pternandra capitellata Jack. Tree, flowers blue, not common, Toas, Selitar.

Pt. coerulescens Jack. Common, Tanglin, Changi, Chan Chu Kang.

Pt. paniculata Benth. Rare, Chan Chu Kang.

Kibessa echinata Jack. "Sial Munahon." A common tree with pale violet fugacious flowers. Dry woods, whole island.

K. acuminata Done. Collected here by Walker and Maingay; not seen.

Memecylon. Trees with small blue or white flowers: a very difficult genus, as the species appear to run into each other.

M. myrsinoides Bl. Bukit Mandai.

M. pauciflorum Bl. "Singapore, Lobb." Not seen.

M. laevigatum Bl. "Dulek." Common on the coasts, Kranji, Sungei Buluh, Bukit Mandai, Pulau Tekong.

M. acuminatum Bl. Thick woods. Bajau, Bukit Timah.

M. grande Retz. A very handsome plant, with panicles of blue flowers. Selitar, Garden jungle, Serapong, Pulau Merawan.

M. heteropleurum Bl. "Nipis Kulit." Garden Jungle, Changi, Bukit Mandai.

M. amplexicaule Roxb. Rare, Chan Chu Kang.

M. sp. Garden jungle (4436).

M. sp. Bukit Timah (6788).

M. sp. Leaves very narrow. Garden jungle (5753).

M. sp. Sungei Morai (3840).

LYTHRACEÆ.

Pemphis acidula Forst. A bush with white flowers. Sea coasts, not common, Changi, Selitar.

Lagerstroemia Flos-Reginæ Retz. Given for Singapore in King's "Materials," is not wild here.

Sonneratia. Large sea-shore trees, often growing in the sea itself.

S. acida Linn. Leaves narrow, stamens red. Rare. Balestier plains, by streams.

S. alba Smith. "Berombong." Big tree, common, stamens white. Jurong, Changi.

S. Griffithii Kurz "Pedada." Toas, Changi, Jurong.

ONAGRACEÆ.

Herbs or shrubs.

Jussiæa repens L. Floating in streams with swollen pithy floats Flowers white with a yellow centre. Tanglin.

J. suffruticosa L. Shrubby, about 5 feet tall with yellow flowers. Common, Serangoon, Kallang, Thomson Road.

J. angustifolia Lam. Herbaceous, about 2 feet tall, nearly glabrous. Common in wet spots.

Ludwigia prostrata Roxb. A small herb with small yellow flowers. Common in wet spots, Tanglin, etc.

SAMYDACEÆ.

Trees or shrubs with usually very small inconspicuous flowers.

Casearia Lobbiana Turcz. A small shrub, not a tree as in King's "Materials," usually about 3 feet tall. Flowers minute green, capsule orange with red seeds. Common in woods all over Singapore.

C. esculenta Roxb. Woods, Sembawang, Selitar.

C. Clarkei King. Rare, Chua Chu Kang.

Osmelia Maingayi King. Tree, not rare, Bukit Timah, Kranji, Bukit Mandai, Toas.

Homalium grandiflorum Benth. Tree, rare, Kranji.

PASSIFLOREÆ.

Modecca Singaporeana Mast. Climber, flowers green, capsule red with black seeds in a white aril. Common, Tanglin, Bukit Timah, Bukit Mandai, Selitar, Pulau Tekong.

M. populifolia Bl. Less common, Bajau.

Passiflora fœtida has established itself in waste ground near Tanglin and elsewhere, as have to a smaller extent *P. suberosa*, *P. minima*, and *P. quadrangularis*.

Cucurbitaceæ.

A good many of these are cultivated by the Chinese here, but very few are wild.

Trichosanthes. Slender climbing pumpkins with white fimbriate tubular flowers, opening about ten o'clock at night, and egg shaped crimson fruit yellow inside the flat seeds enclosed in a dark green slimy pulp. They are said to be poisonous, but are used by the natives in medicine, the pumpkin being squashed on the head to cure headache.

T. Wallichiana Wight. Very common in woods and hedges, all over Singapore.

T. Wawraei Cogn. Not rare, Tanglin.

T celebica Cogn. Leaves deep green rather stiff and shining trifoliate. The fruit much larger and cylindrical oblong. Tanglin, Choa Chu Kang.

Commonly cultivated and sometimes occurring in waste ground are *Lagenaria vulgaris* Ser. Bottlegourd: *Luffa aegyptiaca* Mill. "Petola:" *Momordica charantia* L: *Cucumis sativa* "Timon," cucumber: *Citrullus vulgaris* Schrad. Water melon: *Cucurbita moschata* Duch. *C. pepo* De C. "Labu," and *Benincasa cerifera* Savi. "Kundur."

Ficoideæ.

Sesuvium portulacastrum L. Herb, flowers pink. Tidal mud, Changi, Tampenis road.

Mollugo stricta L. "Tapak Burong." A small weed with white flowers. Common, Tanglin, Changi.

Umbelliferæ.

This order, as elsewhere in the tropics, is very scantily represented. I have doubts as to any of the species being native.

Hydrocotyle asiatica L. "Pegaga." A very variable creeping herb, much in request as a salad and as medicine, it is regularly collected and sold in the herb shops. Very common over the whole island in grassy spots.

H. rotundifolia Roxb. A very small-leaved species. Occurs in flower beds in the botanic gardens as a weed.

Eryngium foetidum Jacq. A prickly herb with a nauseous odour. Eaten by Chinese. About villages, Changi, Choa Chu Kang, etc. A native of the West Indies.

ARALIACEÆ.

Aralidium pinnatifidum Miq. "Tinggal Balai." A shrub or small tree with lobed or entire leaves, panicles of small green flowers and large drupes, at first white, when ripe black with an unpleasant soapy taste. Common, Bukit Timah, Jurong, Kranji.

Heptapleurum arene Seem. Epiphyte usually in mangrove swamps, the lower leaves are trifoliolate, the upper ones simple. Not common, Kranji, Selitar, Pulau Ubin.

H. cephalotes Clarke. A tree. On rocks, Bajau, Kranji, Pulau Ubin.

H. subulatum Seem. Epiphyte on trees in woods, not common, Chua Chu Kang.

H. ellipticum Seem. Epiphyte. Bukit Timah, Kranji.

H. Ridleyi King * An epiphyte, or a shrub on rocks near the sea. Flowers yellow. Not rare, Kranji, Sungai Morai.

H. Hullettii King. A beautiful plant, with handsome foliage, digitate and deep green. Flowers pure white in long axilliary panicles, fruit small purple. A tree, often epiphytic at first. Woods, Chan Chu Kang and Chua Chu Kang.

Arthrophyllum diversifolium Bl. "Jolok Hantu." A tree about 20 feet tall with green flowers and black fruit, very common all over Singapore in open country.

CORNACEÆ.

Marlea nobilis C. B. Clarke. "Sutubal." Big tree. Rare, Bukit Timah,

M. ebenacea C. B. Clarke. "Lidah Kerbau" (Buffalo tongue.)

A very fine and large tree with white flowers. A good timber; the fruit is large and deep purple. Garden jungle.

M. Griffithii C. B. Clarke. Rare, Sungei Buluh.

M. sp. "Kayu Tas." Rare, Ponggol.
This tree is supposed to have remarkable powers in driving away tigers, and the Malays often wear bits of its wood to protect them from these animals.

Mastixia Junghuhniana C. B. Clarke. Garden jungle.

CAPRIFOLIACEÆ.

Viburnum sambucinum Reinwdt. A large bush with white flowers and red drupes. Rare, Road to Kranji near Bukit Mandai.

RUBIACEÆ.

Sarcocephalus Junghuhnii Miq. "Chermin Ayer." A medium sized tree with balls of small yellowish white flowers and hard brown compact heads of fruits. The timber is of fair quality and used for posts. Woods, Tanglin, Siglap, Changi, Selitar.

S. subditus Miq. Rarer, Kranji.

S. Maingayi Hav. Bukit Timah Road.

S. sp. A big tree. Chan Chu Kang (6831).

Adina rubescens Hemst. "Berambong." A tall tree with good yellow timber, remarkable for the curious natural holes or depressions in the trunk. Common Tanglin, Bukit Timah.

Uncaria. "Akar Kait-Kait." There are a number of kinds of wild gambiers, all are climbers, and often climb very high by the aid of short hook-shaped branches, whence the native name (Kait, a hook). Some attain a great size, as thick as a man's leg, and these can be safely depended on

as water-vines, supplying an excellent clear water, to obtain which it is only necessary to cut the stem through at one blow of a parang, as high as can be reached and then cut through it again about three feet below, when the water will drip rapidly from the cut portion. A piece 3 feet long cut like this will give about half a pint of water. The flowers are produced in balls two inches or more through, and are usually green and reddish. The fruits are capsules, with very fine winged seeds.

V. pedicellata Roxb. "Akar Sulumbah." One of the biggest species, with very large flowers covered with white silky hairs. Common on edges of woods, etc. Tanglin, Bukit Timah, Toas, Chan Chu Kang.

V. pteropoda Miq. "Akar Kait-Kait Darat." A very large plant, with broad leaves, stem 4 or 5 inches through. Common in woods, Garden jungle, Bukit Timah, Selitar.

V. attenuata Korth. "Akar Kait-Kait Merah." A smaller plant, the leaves covered with red wool on the back. Not common, Bukit Mandai, Bukit Timah Road.

V. ovata Hook. fil. Rare, Tanglin near the Gardens.

(*V. gambir* Roxb. The gambier plant is cultivated and often persists long after cultivation has been abandoned. It is probably not a native.)

V. jasminiflora Wall. Flowers greenish white. Not common, Dalvey Road, Jurong, Selitar.

V. glabrata De C. Not very common. Bukit Timah, Bukit Mandai, Pulau Ubin.

V. ferrea De C. Chan Chu Kang, Chua Chu Kang.

V. Roxburghiana Korth. Chua Chu Kang, Bukit Mandai.

V. dasyoneura Korth. was said to have been collected here by Lobb. Probably an error for Penang.

Coptosapelta flavescens Korth. A climber with sweet greenish white flowers. Rare, Chua Chu Kang.

Dentella repens Forst. "Bunga Karang." A little creeping weed with white flowers. Common in waste ground, Tanglin, Galang, etc.

Argostemma parvifolium Benn. *A. elatostemma* Hook, and *A. spinulosum* C. B. C., collected by Lobb and labelled Singapore, were doubtless mislabelled. The *Argostemmas* are all hill plants.

Hedyotis capitellata Wall. A climbing plant with greenish heads of flowers. Common in thickets, Bukit Timah, Chan Chu Kang, Bukit Mandai, Chua Chu Kang.

H. vestita Br. "Tokong Bulu." A rough branching herb with whorls of lilac flowers. Waste ground, Bukit Panjang, Changi.

H. auricularia L. Somewhat resembling the last, but less hairy, and with white flowers. Common, Tanglin, Chan Chu Kang, Toas.

H. pinifolia Wall. A common weed in sandy spots with narrow linear leaves and white flowers. Changi, Teluk Kurau, var. *coespitosa*. A much more tufted form, grows in the same places.

H. congesta Br. "Rumput Lidah Jin." A stiff erect coarse herb with white flowers, common in woods, Tanglin, Bukit Timah, Jurong, Blakang Mati.

Oldenlandia corymbosa L. A common little annual weed in waste ground with white flowers. Very variable, the variety *alsinifolia* is as common as any form. Tanglin, Changi, etc.

O. diffusa L. Common in sandy spots. Tanglin, Changi, Jurong.

O. Heynei Br. Tanglin in grass plots.

O. trinervia Retz Sandy places. Galang, Tanglin.

O. dichotoma Retz? Flowers violet. Teluk Kurau.

Ophiorrhiza Harrisiana Heyne. var. A small herb with white flowers. It differs from the type in being very much more pubescent, and having pubescent capsules, and is perhaps a distinct species. Damp rocks in jungles. Common, Chan Chu Kang, Bukit Timah, Bukit Mandai, Chua Chu Kang, Pulau Ubin, Jurong.

Mussaenda glabra Vahl. "Balik Adap." A common and conspicuous shrub with orange or yellow flowers, and one lobe of the calyx developed into a large white leaf-like limb. Very variable. In the typical form the leaves are narrow lanceolate and glabrous in another they are ovate and pubescent. In the var. *setulosa* broad and rounded with bristles on the midrib above and pubescent beneath. Common all over Singapore.

M. variabilis Hemsl. A half scandent shrub with large star-like flowers, at first scarlet, then orange. Common in the peninsula, rare in Singapore. Selitar.

Lucinea morinda De C. Local in deep wet jungle. Bukit Mandai, Chan Chu Kang.

Adenosacme longifolia Wall. A slender shrub about 3 feet tall with small flowers, and translucent white berries. Damp rocky ravines. Bukit Timah.

Urophyllum. Slender shrubs, rarely small trees, with very small white flowers in axillary clusters and yellow or orange berries.

U. Griffithianum Wt. Common in woods, Changi, Bukit Timah, Bukit Mandai, Sungei Buluh.

U. glabrum Bl. Very common, Bukit Timah, Chan Chu Kang, Garden jungle,

U. streptopodium Wall. Common, Garden jungle, Bukit Mandai, Pulau Ubin.

U. hirsutum Wt. Common, Kranji, Toas, Selitar.

U. villosum Wall. "Singapore Lobb," probably an error for Penang.

Lecanamthus erubescens Jack. "Achar Achar." A scrambling epiphyte in swampy jungle. Flowers small white with purple bracts in heads. Chua Chu Kang, Jurong, Selitar.

Webera fragrans Bl. "Jarum Jarum." Shrub with greenish white sweet flowers. Kranji, Bukit Timah, Tanglin, Bukit Panjang.

W. mollis Wall. Small tree, Garden jungle, Bukit Mandai, Selitar.

W. grandifolia Hook. f. A shrub with greenish white flowers. Changi, Bukit Mandai, North Selitar, Bukit Timah.

W. sp. Shrub with white flowers. Tampenis (5961), Sungei Brih.
W. sp. Chan Chu Kang (6147).

Gardeniopsis longifolia Miq. This curious shrub grows in woods. The flowers are seldom produced, they are fairly large and white tinted with rose. Miquel's description of the plant, as obtained by him in Sumatra, fits the peninsular species very well. Bukit Timah.

Randia fasciculata De C. A thorny shrub, common near the sea, Changi, Pasir Panjang, Balestier plain, Teluk Kurau.

R. longiflora Lam. A strong spiny climber with large white flowers. Not common. Garden jungle, Bukit Timah.

R. angulosa, *Canthium angulosum* Wall. A strong spiny climber like the last, but with much smaller flowers in dense heads. It is indeed referred to that species as a variety in the Flora of British India, but seems to me utterly different. Rare, Garden jungle.

R. densiflora Benth. "Merumbong jantan." A fairly big tree with a good timber, flowers small white, berries orange. Common on some spots, Changi, Selitar.

R. anisophylla Jack. "Simpoh." A medium sized tree with small white flowers, and oblong green fruits, woody, containing many flat seeds in a sweet black pulp, eaten by monkeys, but said to be poisonous by the Malays. Common in woods, and secondary jungle all over Singapore.

R. macrophylla Br. 'Delima hutan." A small shrub with large white trumpet-shaped flowers 4 inches across, white with dark purple spots in the mouth. A most beautiful plant. Common, Garden jungle, Changi, Bukit Timah, etc.

Gardenia tubifera Wall. A shrub or large tree with large sweet-scented flowers opening nearly white and becoming orange very quickly. Dense woods and river banks, not very common here. Garden jungle, Changi, the Reservoir.

G. Griffithii Hook. fil. A slender straight tree, with much larger flowers than the last and very large globose fruit. Local, damp thick woods. Bukit Timah, Selitar, Sungei Buluh, Bukit Mandai.

G. speciosa Hook.* "Singapore, Lobb," I have not seen. This fine gardenia has only been collected by Lobb and never met with again.

Petunga venulosa Hook var. (?) Small tree, possibly a distinct species. Garden jungle.

Scyphiphora hydrophyllacea Gaertn. "Chingum." A very common sea shore shrub, with small white flowers. The seeds may often be seen thrown up on the sea shore in great quantities. Along the coast with mangroves.

Jackia ornata Wall. A tall slender tree about 20 feet tall, with drooping panicles of rosy white flowers, and red fruits, very beautiful. Common in open swamps and wet borders of woods. Dalvey road, Bukit Timah, Changi, Selitar.

Guettarda speciosa L. A common small or medium sea-coast tree, flowers white, Changi, Selitar.

Timonius Jambosella Thw. A very common tree 12 to 20 feet tall, with small yellow flowers. Secondary jungle everywhere.

T. Rumphii De C. "Tulang-Tulang Paya." Common in secondary jungle, whole island.

T. Finlaysonianus Wall. A sea-shore plant, flowers white. Tidal rivers, Serangoon, Changi.

Canthium didymum Roxb. "Mata Keli jantan." Tidal rivers and other places near the sea. Common, Kranji, Selitar, Pulau Tekong.

C. glabrum Bl. A tall tree. 20 feet high, with small greenish white flowers and large grey-green plum-shaped fruits containing two 3-sided stones. Woods, Garden road, Toas.

C. confertum Korth. Garden jungle (4124), Selitar, Pulau Tekong.

C. sp. "Gading." The white wood, suggesting ivory, gives it its native name, the leaves are used for making a kind of tea. Not rare, Tanglin. Thomson Road, Selitar, Jurong (6506).

C. horridum Korth. "Bulangan Tikus." A small thorny shrub, with small green flowers and plum-like yellow fruits. Common especially near the coast in dry spots. Tyersall, Tanjong Katong. Bukit Timah, Changi, etc.

C. scandens Bl. "Akar Kuku Baning," lit. tortoise-claws. A thorny climber with pubescent leaves, green flowers and black fruits. Thick Woods, Garden jungle.

Ixora pendula Jack. A pretty shrub about 4 feet tall with clusters of slender flowers white with a pink tube on long hanging peduncles. Fruit small elliptic dark purple. Common in thick woods. Garden jungle, Changi, Chan Chu Kang, Bukit Timah.

I. opaca Br. Woods. Changi, Bukit Timah.

I. fulgens Roxb. "Bunga Pechah Priok," lit. the broken pot. the red spreading corolla lobes supposed to resemble a broken earthenware pot. One of the showiest native plants, the splendid orange red trusses of flowers being most conspicuous. Common in woods, Tanglin, Bukit Timah, Changi, Pulau Tekong, etc.

I. congesta Roxb. A similar plant with broader leaves and shorter flowers. Common, Changi, Chan Chu Kang, Pulau Ubin, Garden jungle.

I. concinna Br. A shrub or small tree, flowers red or yellow. Rather rare, Chan Chu Kang, Chua Chu Kang.

I. parviflora Vahl. A tree with small yellow flowers. Rare, Chan Chu Kang.

I. amara Wall. Shrub with orange red flowers not common, Serembun, Chua Chu Kang.

Pavetta indica L. "Jarum-Jarum." A large bush with greenish white flowers, Kranji, Bukit Timah, Chan Chu Kang.

Morinda citrifolia L. "Mengkudu." A small rarely large tree with white flowers, and large pulpy semitransparent heads of fruits. The bark of the root is used for dyeing and tanning nets, also in native medicine. The fruit is used as soap and eaten. It is very doubtfully wild, though it is very common in waste ground.

M. tinctoria Roxb. "Mengkudu Hutan." A smaller shrubby plant with narrower leaves possibly the wild form of the preceding. Common everywhere in secondary jungle.

M. persicaefolia Ham. Singapore (Maingay): not seen.

M. umbellata L. Climbing or erect shrub, heads of fruit small orange. Very abundant in open country near the sea. Changi, Pulau Ubin.

M. sp. A tall climber with slender stems pubescent leaves and small orange heads of fruits. Garden jungle.

M. sp. "Sulong Akar Darat." A scandent shrub with thick leaves pubescent at the back, flowers few in a head white with a long tube and pubescent mouth, very fragrant. Borders of woods, Changi, Pulau Ubin, Pulau Tekong.

Prismatomeris albidiflora Thw. A pretty shrub with white flowers. Open places near the coasts, also in swampy woods. Changi, Bajau, Selitar, near the Bungalow.

Gynochthodes sublanceolata Miq. A climber with white flowers

and curious lead-grey fruits. Common near the sea, rarer inland, Changi, Tanglin.

G. coriacea Miq. A much larger broader leaved plant. Not common, Changi, Garden jungle.

Psychotria. A large group of shrubs or climbers with white or green flowers, and black orange or white berries.

Shrubs. Berries orange or black.

P. stipulacea Wall. Not common, Bukit Timah.

P. angulata Korth. Changi, Garden jungle.

P. Helferiana Kurz. Common, Garden jungle, Jurong, Selitar. Kranji, etc.

P. Malayana Jack. Fruit black. Bukit Timah (6468), Bukit Mandai, Pulau Ubin.

P. Griffithii Hook. fil. Bukit Timah, Pulau Ubin.

P. montana var. *tabacifolia* Wall. Singapore, Wallich 8331. (Not seen.)

Climbers, berries white or green.

P. polycarpa Miq. "Akar Chinta Mula." Common in hedges, Garden jungle, Changi, Kranji, etc.

P. sarmentosa Bl. Common, woods, Serangoon, Changi, Bukit Mandai, Selitar.

P. Maingayi Hook. fil. Woods, Selitar, Bajau.

P. morindaeflora Wall. Rather common, Sungei Buluh, Bukit Mandai, Chan Chu Kang.

P. oroidea Wall. Common, woods, Garden jungle, Jurong, Bukit Timah.

P. sp. with grey green fruits and large leaves. Reservoir woods.

P. sp. leaves lanceolate, flowers green, Kranji, Ang Mo Kio.

Chasalia curviflora Thw. "Pechah Piring putih." A very common and variable small shrub or herb, flowers white

on purple stalks, berries black on thickened white stalks. Woods, everywhere, Garden jungle, Bukit Timah, etc.

C. rostrata Miq. Garden jungle, Bukit Timah.

Geophila hirta Miq. Creeping plant with white flowers, local. Reservoir woods, Bukit Timah.

Cephaelis Griffithii Hook. A small shrub with yellow honey-scented flowers in an involucrate head; berries light blue. Sandy woods, Toas, Bajau; also Garden jungle.

Lasianthus, small shrubs with axillary whorls of white flowers and blue or white berries.

L. cyanocarpus Jack. Sea coasts, Pasir Panjang, Changi, Pulau Ubin, Pulau Tekong.

L. appressus Hook. fil. Garden jungle, Bukit Timah, Chan Chu Kang.

L. pterospermus Wt. Rare, Chan Chu Kang (6711).

L. densifolius Miq. Common, Garden jungle, Changi, Bukit Timah, Seletar.

L. Griffithii Wt. Common, Bukit Timah, Chan Chu Kang, Sungei Blukang.

L. stipularis Bl. Bukit Timah (4903).

L. elliptieus Wt. Garden jungle, Bukit Timah, Chan Chu Kang.

L. crinitus Hook. fil. Garden jungle, Bukit Mandai, Pasir Panjang.

L. Maingayi Hook. fil. Singapore (Hullett 628.) and several other unidentified species.

Saprosma sp. Rare, Bukit Mandai.

Hydnophytum formicarium Jack. The ant plant. "Kapala Beruk." one of our most curious plants, epiphytic with a large swollen tuberous stem containing passages always full of

ants, flowers small white, fruits orange juicy. Common Tanglin, Selitar, Sungei Morai, etc.

Myrmecodia echinata Jack. Much resembles the last, but is covered with spines. Rarer, Bukit Timah, Jurong.

Poederia foetida L. "Akar Sekuntut." A slender climber with panicles of violet and white flowers. The whole plant has an unpleasant odor. Not common, Chan Chu Kang, Bukit Timah.

P. tomentosa Bl. Singapore (Fl. Brit. Ind.) : not seen.

Spermacoce hispida L. A common weed with pink flowers. Paths and waste ground, Tanglin, Changi, Selitar, etc.

S. scaberrima Bl. A rough scrambling herb, flowers white. Waste ground, Chasseriau estate.

S. ocymoides Burm. A prostrate herb, flowers white. Roadsides, Choa Chu Kang, Passir Panjang, Gardens.

COMPOSITÆ.

This large order is represented here by four or five native plants and a number of weeds introduced, but now established in waste ground and such places.

Vernonia arborea Ham. "Merambong." A large tree with lavender colored flowers. There are two forms of it, one a tall straight tree 50 feet high with perfectly glabrous leaves, Cluny Road, etc., and one more stunted and gnarled with pubescent leaves, Changi, Chan Chu Kang, Jurong, Chua Chu Kang.

V. cinerea Less. A common little weed with purple flowers, grows everywhere.

V. chinensis L. "Ruku Gajah." A larger rough herb, flowers purple. Common in villages, Chan Chu Kang, Tanglin, Bukit Mandai.

V. scandens De C. "Tombak-Tombak." A climber in thickets, flowers yellow. Tanglin, Bukit Timah, Selitar, Changi.

Elephantopus scaber L. "Tutup bumi." A very common weed flowers pink. Whole island.

Adenostemma viscosum Forst. A coarse herb with white flowers, waste ground near houses, Chan Chu Kang, Pulau Ubin, Bukit Panjang.

Ageratum conyzoides L. An exceedingly common weed with blue or white flowers, everywhere.

Mikania scandens Willd. "Akar Churoma." A climber with hanging heads of flowers. Thickets, not common, Jurong, Woodsville.

Erigeron linifolius Willd "Sumbong Jantan." A large coarse weed. Waste ground, Tanglin, Selitar, etc.

Blumea lacera De C. An erect herb with yellow flowers. Common waste ground and grassy places. Tanglin, Selitar, etc.

Bl. membranacea De C. Alexandra Road.

Bl. balsamifera De C. Ngai Camphor. "Sumbong." A tall herb about 8 feet high or less, with yellow flowers. The whole plant has a strong camphor smell, and is used in medicine by the natives. Very common in open ground, Tanglin, Bedoh, etc.

Pluchea indica Less "Poko Beluntas." A sea-shore shrub with lilac flowers. Very common on the sea coast, Changi, Galang, etc.; rarer inland, Tanglin, near the rifle range,

Sphoeranthus africanus L. A herb with heads of white flowers. Ditches, Galang.

Cæsulia axillaris Roxb. Ditches, Tanglin and Galang.

Eclipta alba Hassk. Common weed in waste ground, flowers white.

Centipeda orbicularis Lour. A very small prostrate weed with minute purple flowers. Paths in the Botanic gardens.

Wedelia biflora De C. "Serenai Laut." Sea-shore herb with yellow flowers. Common, Galang, Kranji, Changi.

Spilanthes acmella L. "K'rabo." The toothache plant, a common weed with conical heads of yellow flowers very pungent. Sold in the native herb shops. Open country, Sungei Morai, Ang Mo Kio.

Synedrella nodiflora Gaertn. Stiff weed with yellow flowers. Very common everywhere.

Tridax procumbens L. Sandy places, Tanjong Katong, Cathedral Close, Changi, Teluk Kurau.

Artemisia vulgaris L. Often cultivated for medicine in Chinese villages.

Gynura sarmentosa De C. "Akar Subiak." Climbing herb with glaucous green leaves, and yellow flowers in a purple involucre. Swampy spots in dense jungle, Bukit Mandai, Bukit Timah, Tanglin.

G. pseudochina De C. A coarse common weed, Tanglin, Tanjong Katong, Selitar, etc.

Emilia sonchifolia De C. "Katumbi jantan." Common herb with bright pink flowers, waste ground.

(*Cosmos bipinnatus*. Often cultivated as a vegetable.)

Acanthospermum xanthioides De C. Prostrate herb with white flowers and burr-like fruit. Not common. Pasir, Panjang, Ang Mo Kio, Tanglin.

GOODENOVIEÆ.

Scævola Koenigii Vahl. "Ambong-ambong." A common sea-shore shrub. Flowers and fruit white. All round the coasts. Changi, Selitar, Pulau Ubin, Blakang Mati.

CAMPANULACEÆ.

Pratia begonifolia Lindl. Small creeping herb with blue and white flowers. Wet spots by streams, Bukit Timah, Choa Chu Kang.

Pentaphragma begoniæfo'ium Wall. "Balong Ayam Batu." (Rock Cock's comb), a very curious herb with scorpioid spikes of creamy yellow flowers with purple spots inside. Banks in woods, common, Bukit Timah, Sungei Morai, Changi, Chua Chu Kang.

VACCINIACEÆ.

Vaccinium malaccense Wt. "Kalumpadang." A large bush with pink or white fragrant flowers and eatable black fruits. Sandy places at Changi, abundant.

V. bancanum Miq. Epiphytic or terrestrial. A bush or small tree, leaves often red stiff, flowers waxy pink red or white. Sea coast, Toas, Changi, Sungei Morai, on high trees, Bukit Timah.

V. acuminatissimum Miq. Rare, Bukit Mandai.

ERICACEÆ.

Rhododendron lampongum Miq: *R. javanicum* var. *tubiflorum*. Bot. Mag. t 9840. A beautiful epiphytic shrub on the tops of lofty trees. Bukit Timah, very rare. Flowers bright red.

EPACRIDEÆ.

Leucopogon malayanus Jack. Shrub with small white flowers and red fruit. Sea shore, Changi.

PLUMBAGINEÆ.

Plumbago zeylanica L. "Cheraka." Waste ground near villages, Galang, etc.

MYRSINEÆ.

Maesa indica L. A large shrub or small tree with very small white flowers. Common in woods, Bukit Timah, Reservoir woods, etc.

M. ramentacea De C. A half climbing shrub with narrower leaves, but otherwise much like the last. The branches

often bear moss-like masses of abortive branchlets, which are much more elegant than the very insignificant flowers. One of the commonest shrubs in jungles and secondary forest, everywhere.

Myrsine capitellata Wall. A small tree, with small white flowers and fruits. Sea coasts, not common, Changi, Bajau.

Embelia Ribes Burm. Very common in woods and thickets, Tanglin, Bukit Timah, etc.

Var. *garciniifolia*. A distinct looking plant with much more coriaceous leaves. Rarer, Changi, Reservoir woods, Bukit Timah.

E. coriacea A. De C. Thick jungles. Selitar, Bukit Mandai.

E Limpanii Scheff. Hedges, not common, Changi, Bukit Timah.

E amentacea Clarke. Hedges, Bukit Timah Road, Bukit Mandai,

E. lucida Wall.* Cat 2315. Singapore. I have not met with it.

Labisia pothoina Lindl. "Akar Fatimah." A little shrub with small pink flowers, and scarlet fruit, leaves of young plants crenulate deep green edged with pink, when older lanceolate with long petioles (var. *lanceolata*) or the petiole winged the whole length, (*pothoina* proper). Common in dense woods.

Ardisia. Shrubs, rarely small trees, with or rose pink flowers, often showy, and red or black berries.

A. crassa Clarke. Rare, Chan Chu Kang (3844).

A lanceolata Roxb. Very handsome shrub. Selitar, Bukit Timah.

A. colorata Roxb. Flowers very small, pale pink. Common, Bukit Timah, Garden jungle, Changi Road.

A. tuberculata Wall. Common, Bukit Timah, Selitar, Sungei Morai.

A. crenata Roxb. "Mata Pelandok." Common, Alexander Road, Changi, etc.

A. villosa Roxb. Rare, dense woods, Pulau Ubin.

A. odontophylla var Lobbii. Singapore, Lobb; probably an error of locality.

A. sp. near *Bhotanica* Clarke. Rare, Ang Mo Kio (6434).

A. sp. near *villosa*. Rare, Pulau Ubin (2816), Changi.

A. humilis Vahl. One of the largest species, flowers rose pink, berries black. Tidal mud, and damp spots. Common, Galang, Holland Road, Tanjong Katong, Changi, etc.

Pimelandra Wallichii De C. A small tree, flowers pinkish white, berries white with black spots. Common, Tanglin, Changi, Sembawang

Aegiceras majus Gaertn. Mangroves local, Toas, Sungei Morai, Pulau Ubin.

SAPOTACEÆ.

A group of trees, of which many produce gutta percha or Caoutchouc. There are a considerable number here, but they are difficult to collect on account of their great size, and are not easy to identify.

Chrysophyllum Roxburghii G. Don. A tall tree with small dark green leaves and yellow flowers, fruit globose 5-angled yellow $\frac{1}{2}$ an inch long, sweet and eatable but full of rubber. Not rare, Tanglin, Bukit Timah.

Sideroxylon ferrugineum Hook. Small tree or shrub. Common along the coast, Serangoon, Kranji, Changi, Pulau Damar.

S. Maingayi Clarke. Big tree. Garden jungle.

S. Maluccense Clarke. Very large tree. Tanglin, Garden jungle, Selitar.

Dichopsis lancæfolia Miq. Vast tree, flowers and fruit green. Garden jungle.

D. obovata Clarke. A big tree producing a gutta inferior only to that of *D. Gutta*. Tanglin, Changi.

D. Gutta Benth. A large tree, easily known by the beautiful golden underside of the leaves. Though it was formerly very abundant in Singapore, nearly all the larger trees have been cut for the gutta percha. Flowers small white, very rarely produced. *D. oblongifolia* is I think specifically undistinguishable, merely a variety. It is the commonest form now in Singapore. Dense jungle, widely scattered over Singapore. Garden jungle, Bukit Timah, Selitar, Pulau Damar.

D. rubens Clarke. Rare, Changi, Chan Chu Kang.

Bassia Mottleyana De Vr. A big tree, Selitar, Jurong, Kranji, Bukit Mandai.

B. cuneata Bl. Rare, Bukit Timah.

B. Kingii Stapf. Bukit Timah.

B. Malaccensis (*Payena Malaccensis* Clarke). Common, Garden jungle, Changi, Bukit Timah, Selitar.

Payena costata King. "Niato." Common, a medium sized tree. Garden jungle, Selitar, Reservoir woods.

P. Maingayi Clarke. "Getah Percha Burong." Rare, Sungei Morai (6497).

P. Lecrii Benth. "Getah Sundik." Bukit Timah, Bajau.

Mimusops heyandra Roxb. "Niato hitam." Rare, Tanjong Gol.

(*M. Elengi* L. "Poko Tanjong." Commonly planted, but doubtfully wild.)

EBENACEÆ.

Maba buxifolia Pers. Small tree. Rare, Tampinis.

Diospyros microphylla Bedd. Large tree, produces ebony. Garden Road, Bukit Timah.

D. lucida Wall. "Kayu Arang." Woods, usually near the sea, not rare. Bukit Timah, Bukit Mandai, Changi, Loyang, Bajau, Tampenis, Sungei Morai.

D. bibracteis Oliv. *Maba Maingayi* Hiern. Tree. Garden jungle.

D. sapotoides Kurz. Very large tree, Bukit Timah, Chan Chu Kang.

D. oblonga Wall. Garden jungle, Bukit Timah, Tanjong Gol.

D. clavigera Clarke. Produces ebony. Sungei Morai.

D. argentea Griff. "Bedil Lalat." "Mulatope Lalat." A small tree with large leaves coated beneath with golden yellow fur. Fruit large, covered with red hair. The dried leaves when burnt crackle, and this is supposed to drive away mosquitoes, hence the native name "Fly-cracker." Not rare. Dense jungle, Bukit Timah, Changi, Chan Chu Kang.

D. sp. with large coriaceous leaves, and cream colored flowers on the stem, fruit pearshaped. Bukit Timah.

STYRACEÆ.

Symplocos, small or medium trees with white flowers and blue or green fruit.

S. spicata Roxb. Rare, Bukit Mandai.

S. fasciculata Zoll. Flowers white in small nearly sessile cymes drupes blue. Very common, woods and secondary jungle. Tanglin, Bukit Timah, Selitar, etc.

S. adenophylla Wall. Common in woods, especially near the sea. Changi, Jurong, Kranji, Toas, Pulau Tekong.

S. celastrifolia Griff. Rare, Jurong River (8423).

S. rubiginosa Wall. Not very common, Chan Cha Kang, Bukit Timah.

S. rigida Clarke. A big tree. Rare, Changi.

S. sp. "Donoon." A medium sized tree, flowers in compact cymes. Rare, Kranji.

Styrax Benzoin Dryand. Gum benjamin. "Kemeniyan." A tall tree with sweet white flowers, and hard grey round flattened fruits. Produces the gum benjamin of commerce, which is obtained by cutting gashes in the bark, when the gum, after some weeks, exudes. Common in jungle, Garden jungle, Bukit Timah, Selitar, Choa Chu Kang.

S. crotonoides Clarke. Singapore (Wallich No. 7848); also in Cantley's collection. I have never seen it here.

OLEACEÆ.

Jasminum lifarium Wall. "Melor hutan." Wild Jasmine, very common in open country, and hedges, Tanglin, Balestier plain, Changi, etc.

J. Griffithii Clarke. "Kuma-Kuma hutan." A very hairy jasmine. Rare, woods, Garden jungle, Bidadari, Chan Chu Kang.

Olea maritima Wall. A large bush with small green flowers and black drupes. Sea coasts in dry spots, Tanjong Katong, Changi, Pulau Ubin.

Linociera pauciflora var. *palembanica*. A big tree with small white flowers. Common, Bukit Mandai, Bukit Timah, Changi.

APOCYNACEÆ.

Willughbeia firma Bl. "Getah Grip or Gegrip." A large woody climber with rough black bark, white flowers and green or orange oblong or globose fruits. Seeds deep violet inside. It abounds in rubber, and is the best of all the local rubber vines. The fruit is eatable and sweet, but full of rubber milk. Common, Garden jungle, Bukit Timah, Changi, etc.

W. coriacea Wall. "Getah Ujol." An inferior Gutta, which does not set readily, it is used for adulterating and for

bird lime. Common, Tanglin, Bajau, Changi, Blakang Mati, Bukit Timah.

W. flavescens Dyer. Flowers short yellowish white, fruit globose orange, containing 2 to 7 seeds. Garden jungle, Pulau Ubin.

W. tenuiflora Hook. fil. Changi.

W. sp. near *flavescens*, with very small flowers. Corolla tube short and globose, lobes long. Changi (6023), Chan Chu Kang, Jurong.

W. grandiflora Dyer. Flowers larger than any other species $1\frac{1}{2}$ inch long. I take this to be the plant intended for *W. grandiflora*, but note that the leaves are not thickly coriaceous, nor rounded at the tip as described. The mouth of the corolla tube is hairy. Rare. Reservoir woods.

Leuconotis Griffithii Hook. fil. "Akar Getah Sundek." A climber, but less thick than *Willughbeia* (not erect as stated in Fl. Brit. Ind.). Flowers orange fruit globular rather small. Not rare. Borders of woods, Jurong, Bukit Mandai, Selitar, Bukit Timah.

L. Maingayi Dyer. Singapore (Maingay); not seen here.

Melodinus orientalis Bl. Climber, rare, Changi.

M. micrantha Hook. fil. Jalan Bray.

Alyxia lucida Wall. "Pulasari." Bark strongly scented as of new mown hay. Climber, flowers white fragrant. Bukit Mandai, Jurong. Kranji, Sungei Morai.

Cerbera lactaria Ham. "Buta-Buta." A large tree with white flowers and a pink eye and large ovoid reddish fruits. The white milk with which the tree abounds is poisonous and said to cause blindness if it falls into the eye. Very common in tidal rivers and swamps. Balestier plain, Selitar, Tampenis.

C. odollam Gaertn. Kranji, Changi.

Kopsia macrophylla Hook. fil. Shrub about 15 feet tall, flowers white with pink ring in centre. Chan Chu Kang.

(*Vinca rosea* L. has established itself in many places near the sea, and *Allamanda Schottii* Pohl. has run wild in a few places.)

Alstonia scholaris Br. "Pulai." A tall tree, flowers green, branches in distant whorls. Common, Tanglin, Reservoir woods.

A. spathulata Bl. Jungle swamps. Cluny Road, Bukit Mandai.

A. angustifolia Wall. "Buta Buta Darat." Common woods, Bukit Timah, Changi, Kranji. Sungei Morai.

A. grandifolia Miquel. Singapore (Anderson); doubtful.

Dyera laciflora Hook. fil. "Jelutong." A big tree with grey smooth bark, flowers small white. Pods very large and woody. Seeds thin flattened winged. Produces an inferior rubber. Common all over Singapore. Tanglin, Changi, etc.

Tabernaemontana corymbosa Roxb. "Jelutong Badak." A small tree with white flowers fragrant. Not very common, Changi, Reservoir woods, Choa Chu Kang.

T. hirta Hook. fil. Chan Chu Kang, Jurong.

T. Malaccensis Hook. fil. "Lada La la jantan." A shrub with small white flowers and orange pods containing several seeds wrapped in crimson arils. Common in woods. Garden jungle, Changi, etc.

(*T. coronaria* Roxb. "Bunga susu." Is often cultivated and half wild near villages.)

Parsonsia spiralis Wall. Climber with greenish yellow flowers. Mangrove swamps. Not rare, Changi, Tampenis, Selitar, Toas, Sungei Morai.

Vallaris Maingayi Hook. fil. A large tree with deep green leaves and large white flowers. Pods long and slender

containing many long-plumed seeds. Not common, Garden jungle.

Strophanthus dichotomus De C. "Bunga Hantu." A big shrub with large white flowers, with long claret-colored tails to the petals. Open country, Changi, Alexandra road.

S. brevicaudatus Wt. Smaller shrub with small deep purple flowers. Tanglin, Holland road, Balestier plain.

Urceola Malaccensis Hook. fil. "Getah grip tembaga." A climber flowers very small white. Produces a fairly good rubber. Thickets, Tyersall, Changi, Bedoh.

U. Maingayi Hook. fil. Rare, Kranji.

U. brachysepala Hook. fil. Bukit Mandai, Bukit Timah.

U. torulosa Hook. f. Jungles, common, Tampenis, Changi, Chan Chu Kang.

U. lucida Benth. Changi, Pulau Ubin.

Parameria polyneura Benth. Climber with pink flowers, Garden jungle, Cluny Road.

P. glandulifera Benth. "Singapore Lobb"; not seen.

Aganosma marginata Don. Singapore, (Fl. Brit. Ind.); not seen wild.

ASCLEPIADEÆ.

Streptocaulon Wallichii Wight. Singapore, Wallich in Fl. Brit. Ind.; but Wallich's No. 8249 is in the Catalogue "Penang et Singapore;" doubtless from Penang only, where it is common.

Toxocarpus Griffithii Don. "Singapore, Lobb"; certainly an error of locality.

Genianthus Maingayii Hook. fil. Very rare, Bukit Timah, (Cantley).

(*Calotropis procera* Br. Escape from cultivation, Toas, Changi, Pulau Ubin).

(*Asclepias curassarica* L. has established itself at Selitar, etc.)

(*Raphistemma pulchellum* Wall. Garden road; escape.)

Sarcolobus globosus Wall. Climber, flowers small yellow with brown streaks. Tidal river banks, not rare, Balestier plain, Alexandra road, Kalang Puding, Changi, Selitar river.

Stephanotis Maingayi Hook. fil. A splendid white flowered climber, flowers bigger than the garden Stephanotis. Very rare, Changi (Hullett), once collected.

Tylophora tenuis Wall. Slender climber, flowers pink. Hedges Blakang Mati, Green Hill, Alexandra road.

T. Wallichii Hook. fil. "Singapore, Wallich" in Fl. Brit. Ind., but No. 8194 B. in Wallich's catalogue is labelled Habit ignot.

Cynanchum ovalifolium var. Bamboo Hedges, Cluny road, Balestier plain, Bukit Timah Road.

Dischidia nummularia Br. An exceedingly common creeping epiphyte draping orchard trees, and doing much damage. Stems very slender, leaves small and fleshy flowers white (scarlet as in Fl. Brit. Ind.). Whole island.

D. hirsuta Decne. Flowers red. Common in woods, Selitar, Chan Chu Kang, Kranji.

D. albida Griff. Flowers creamy white. Rare, Bajau.

D. benghalensis Colebr. A long creeping epiphyte, glaucous green often nearly leafless. Flowers creamy white, woods near the sea. Kranji, Sungei Buloh, Bajau.

D. Rafflesiana Wall. A very curious plant with some leaves developed into pitchers, green or often yellow, inside purple, flowers yellow. Common on trees especially near the sea. Tanglin, Blakang Mati, Teluk Kurau.

D. collyris Wall. A slender creeper on trees, leaves rounded buff yellow, above purple beneath, lying flat on the trees.

Flowers white. Ants often make their nests between the leaves and the branches of the trees. Common, Tanglin, Chan Chu Kang, Bukit Timah, Kranji.

D. coccinea Griff. Flowers scarlet. On lofty trees, Bukit Timah, Selitar, Choa Chu Kang. Very distinct from the last, of which Maingay suggested it was a variety.

D. Wallichii Wt. Wall. Cat. 8183. Is apparently a *Ficus*.

Hoya lacunosa Bl. Flowers white. Not rare, Tanglin, Selitar, Bukit Mandai.

H. revoluta Wt. Singapore, Wallich 8160 B; not identified.

H. latifolia Don. A very large-leaved species, leaves often dull red, flowers small pink. The commonest species. Trees in dense jungle. Garden jungle, Kranji, Selitar, Pongol, Changi, Pulau Tekong.

H. parasitica Wall. Common near the sea, very floriferous, and pretty, flowers pink. Blakang Mati, Changi, Chan Chu Kang, Toas, Pulau Jahat.

H. coronaria Bl. The largest-flowered species. Flowers star-like and waxy opening white, with a yellow tint, then becoming spotted with pink and finally altogether pink. Common especially near the sea. Serangoon, Changi, Kranji, Pulau Tekong, etc.

H. diversifolia Bl. A pretty pink flowered species, often covering trees like a mat. Jurong, Chan Chu Kang, Kranji. Serangoon.

H. coriacea Bl. Flowers yellowish white. Rare, Tampenis (D'Almeida).

H. obtusifolia Wt. A very stout kind with thick oblong leaves. Flowers white with a pink centre, large, rarely produced. Serangoon, Changi.

H. Finlaysonii Wall. Cat 8166. Leaves only, not identified.

Physostelma Wallichii Wt. "Akar Siak." Slender climber with large thin creamy white flowers with a purple centre.

Roots scented like new mown hay. Rare, Tampenis river, Kranji, Toas.

Leptadenia reticulata Wt. "Singapore, Lobb:" evidently wrongly localised.

LOGANIACEÆ.

Fagraea carnosa Jack (?) Epiphyte, Bukit Timah. Rare. Perhaps a new species, leaves large ovoid, flowers with a long tube in pairs.

F. auriculata Jack. A large spreading shrub, with enormous thick white trumpet-shaped flowers. The capsule is very large greyish green conic, splitting when ripe and showing the minute black seed in orange pulp. There are two forms: one has the flowers as large as in Miquel's picture, the other is much smaller. Not common, rocks overhanging the sea, Pulau Ubin.

F. elorata Wall. Not common, Kranji.

F. racemosa Jack. A big shrub or small tree with short thick racemes of pinkish white flowers. Rare here. Pulau Ubin quarries.

F. moniliefolia Bl. Shrub with slender racemes of pink flowers. Not uncommon. Bukit Timah, Kranji, Selitar, Sungei Loyang.

F. ligustrina Bl. A tree, leaves deep green small flowers slender creamy white with buff coloring in the throat, fragrant. Rare, Tampenis.

F. fragrans Roxb. "Tembusu." A large tree with cream yellow flowers, and orange berries. Well known for its timber. Sandy places, Changi. Abundant, Tanglin and other places near town.

F. speciosa Bl. A very much larger tree, with fewer and larger flowers. Garden jungle, Tyersall.

Norrisia maluccensis Garden. A fairly large tree, flowers white Garden jungle, Changi.

Strychnos Tieute Bl. "Ipoh Akar." A big climber with small tubular green flowers, fruit large globose gray green with a hard rind, seeds flat, enclosed in a bitter pulp. Every part of the plant, even the flowers, is intensely bitter, from the presence of Brucine, nevertheless monkies and musangs often eat the fruit. The bark is used by the Sakais in their dart poison. Common in thick jungle. Garden jungle, Chan Chu Kang.

S. malaccensis Benth. Not common. Toas, Garden jungle.

S. pubescens Clarke. Bukit Timah.

Guertnera Koenigii Wt. var. *oxyphylla* Wall. Singapore (Wallich); not seen.

G. vimined Hook. fil. Small slender shrub, with very small white flowers. Common, Garden jungle, Bukit Timah, Pulau Ubin, Changi.

G. obesa Hook. fil. An unbranched erect shrub with dark green leaves and heads of white flowers, berries pale blue. Common in jungles, Tanglin, Selitar, Bukit Arang, Toas, Sungei Bulub, Bukit Timah.

G. grisea Hook. fil. Not rare, Bukit Timah, Changi, Chan Chu Kang, Sungei Morai.

GENTIANACEÆ.

Limnanthemum indicum Thw. An aquatic plant with round floating leaves and a tuft of white flowers with a yellow centre. Reservoir.

BORAGINEÆ.

Tournefortia Wallichii De C. Climber, flowers green. Thickets, Bukit Panjang, Jurong, Bukit Mandai.

Heliotropium indicum L. A common weed in waste ground everywhere.

Cordia myxa L. Shrub, Chan Chu Kang. Pasir Panjang.

Convolvulaceæ.

Erycibe malaccensis Clarke. Not common, Chan Chu Kang.

E. Princei Wall. "Akar Kijang." Flowers white, coarsely scented, drupes black. Common, hedges, Tanglin, Jurong Kranji, Chan Chu Kang.

E. Griffithii Clarke. Not common, Garden jungle, Bukit Timah.

E. coriacea Wall. Not common, Changi.

E. leucocyloides King. A small-leaved climber, flowers white sweet. Thickets and woods, rarely flowering, common, Tanglin, Chan Chu Kang, Bukit Timah, Changi.

Lettsomia tomentosa. "Akar Terong." Climber, with heads of white flowers with pink plaits, bracts pink, and fruit pink. Woods, Chan Chu Kang, Chua Chu Kang, North Selitar.

Ipomea digitata L. A large pink convolvulus. Not rare, Bukit Timah Road, Loyang, Changi beach, Chan Chu Kang.

I. angustifolia Jacq. Small climber, flowers pale yellow or nearly white eye maroon. Common in grass, or bushes. Tanglin, Changi, Chan Chu Kang, Kranji.

I. tridentata Roth. Prostrate with slender stems, flowers small white. Sandy spots, Changi.

I. linifolia Bl. Twining and creeping in grass, flowers pale yellow. Common, Tanglin, Chan Chu Kang.

I. chryseides Ker. Flowers in heads small lemon yellow Waste ground, Tanglin, Government Hill, Bukit Timah Road, Bajau.

I biloba Forsk. "Tapak kuda." Flowers large pink. Sea shores, common, Changi, Sungei Morai.

I. denticulata Chois. Flowers pink. Sea shores, Teluk Kurau.

I. palmata Forsk. Hedges, Tanglin, Sophia Road.

I. sepiaria Koen. White with a pink eye; *I. quamoclit* L. and *coccinea* with small scarlet flowers; *I. batatas* L. the sweet potato, "Keledi," flowers pink; and *I. aquatica* Forsk. "Kangkong," a white flowered aquatic eaten as spinach, occur as escapes from cultivation here and there.

Evolvulus alsinoides L. A little prostrate plant, flowers light blue. Sandy spots, Changi.

SOLANACEÆ.

I doubt that any of these, except one *Solanum*, are native to Singapore.

Solanum nigrum L. Galang.

S. torvum Sw. Shrub with white flowers, the leaves smoked by Malays like tobacco. Waste ground, Tanglin.

S. melongena L. "Brinjal." Cultivated.

S. sarmentosum Nees. A prickly prostrate plant with blue flowers and black fruits, weed. Botanic Gardens.

S. aculeatissimum Jacq. "Terong Blanda." A prickly shrub with white flowers, and smooth red orange fruits. Sandy places, Tanjong Katong, perhaps wild.

S. biflorum Lour. Singapore (Wallich); more probably an error for Penang. It is a hill plant.

Capsicum frutescens L. *C. minimum*, and more rarely *C. grossum* Willd. are much cultivated, and the two first occasionally occur as escapes.

Datura fastuosa L. "Kachubong." Weed in waste ground, often planted for use in medicine. Tanglin, etc., Pulau Ubin.

SCROPHULARINEAE.

Mazus rugosus Lour. Small weed, flowers pale violet almost white in the centre of the lip, where are 4 or 5 yellow spots. Waste ground, Botanic gardens.

Adenosma oratum Benth. An aromatic herb about 2 feet tall with axillary pale blue flowers. Road sides, not rare, Tanglin, Chan Chu Kang.

A. capitatum Benth. "Kuching-Kuching." Aromatic, flowers in heads blue. Sandy fields, Tanglin, Chan Chu Kang, Jurong, Serangoon.

A. caruleum Br. Singapore (Fl. Brit. Ind.); not seen.

Limnophila conferta Benth. "Bremi" A little aromatic herb with violet flowers, used in native medicine. Common in damp spots, Tanglin, Bukit Timah, Reservoir, Bukit Mandai.

L. pulcherrima Hook. fil. Wet spots, Selitar, Bukit Timah, Bukit Mandai, Chan Chu Kang, Jurong.

Herpestes Monniera H. Bk. A small glabrous herb in wet spots, flowers white or blue. Common, Bukit Timah, Rochore, Serangoon, Teluk Kurau, Tampenis, etc.

Artanema angustifolium Benth. Singapore (Wallich 3885), not seen.

Torenia polygonoides Benth. Common little creeping plant in grass, upper lip of corolla red, lower white. Whole island, Tanglin, Changi, etc.

T. micronulata Benth. Weed in Botanic gardens, Bukit Timah.

Vandellia crustacea Benth. "Kra Nasi." Common little weed with violet flowers. Paths and waste ground everywhere.

V. scabra Benth. Flowers pink. Teluk Kurau.

V. hirsuta Benth. Little weed, hairy, flowers pale lilac. Garden weed.

V. pedunculata Griff. Wet spots, flowers pale violet. Government Hill.

Bonnaya veronicaefolia Spreng. Wet spots, Chan Chu Kang, Ang Mo Kio.

B. reptans Spreng. Chan Chu Kang, Bukit Panjang.

B. brachiata Link. Chan Chu Kang.

Scoparia dulcis L. "Té Macao." A common weed with small white flowers. A tea for fever is made of it. Whole island.

Striga lutea Lour. "Rumput Siku-Siku." A little stiff erect herb in grass, flowers pink, or white here. Common. Tanglin, Changi, Chan Chu Kang.

LENTIBULARIEÆ.

Utricularia flexuosa Vahl. "Lumut Ekor Kuching." Aquatic with bright yellow flowers. Pools, lakes, and ditches. Common. Garden Lake, Reservoir, Bukit Timah, Changi Road.

U. exoleta Br. Much smaller than the last. Garden lake, ditches Tanglin, Ang Mo Kio.

U. bifida L. A small erect plant with yellow flowers. Common in shallow ditches and wet sand. Bukit Timah, Chan Chu Kang, Reservoir, Bedok.

U. affinis var. *Griffithii.* A tall slender species with bright blue flowers. In shallow ditches, Changi, Tampenis, Bedok, Choa Chu Kang.

U. racemosa Wall. Very slender, with very small white flowers. Sandy spots towards Tanah Merah, Changi.

GESNERACEÆ.

Æschynanthus Motleyi Clarke. An epiphyte forming large tufts with pendulous branches, leaves pink on the back. Calyx lobes very narrow purple. Corolla green marked in the mouth with brownish red. Woods, not rare, Bukit Mandai, Kranji, Choa Chu Kang, Teban, Selitar.

Æ. Lobbiana Hook. Climbing epiphyte, flowers crimson scarlet showy. Common in damp woods, and mangrove swamps, Kranji, Toas, Chan Chu Kang.

E. radicans Jack. Creeping over rocks and trees, flowers crimson. Local. Bukit Timah, Choa Chu Kang.

E. Wallichii Br. Calyx short cup-shaped green, corolla crimson. Dense woods, Bukit Mandai, Kranji, Chan Chu Kang.

Didymocarpus platypus Clarke. A shrubby plant with white rarely bluish flowers, with a yellow spot in the mouth. Common, woods, Bukit Timah, Bukit Mandai, Chan Chu Kang, Changi.

D. sp. Very rare, two plants out of flower in a wooded ravine near Bukit Mandai.

Cyrtandra bicolor Jack. A shrubby plant, flowers white with brown or purple spots in the mouth. Leaves sometimes marbled white. *C. humilis* Bl. "Singapore, Prince," in Flor. Brit. Ind. is evidenily the same thing. Damp ravines in wet jungle, usually very abundant. Bukit Timah, Bukit Mandai, Choa Chu Kang.

C. pilosa Bl. "Singapore Lobb," and *Cyrtandromœa acuminata* Benth. Maingay and Lobb, in Flor. Brit. Ind. evidently errors of locality

Bignoniaceæ.

Dolichandrone Rheedii Seem. Shrub or tree with long tubular white flowers opening in the early morning and closing soon. Common. Tidal Rivers, Alexandra Road, Blakang Mati, Bajau, Ponggol, Pulau Ubin.

Stereospermum chelonoides De C. Tree. "Chachar." Rare, Bukit Timah.

S. hyposticta Miq. Tree, flowers white or violet. Not rare, Tanglin, Bukit Timah, Bukit Mandai.

Pedalineæ.

Sesamum indicum De C. Til-seed. "Bijan." Weed in waste ground. Flowers pink rarely white. Cultivated for the seed, which is crushed for oil. Tanglin, etc.

ACANTHACEÆ.

Thunbergia alata Bojer., climber with yellow or orange flowers with or without black eye, and *T. fragrans* Roxb. with white flowers, are common in hedges, being escapes from cultivation.

Ebermaiera Griffithiana Anders. Dense jungle, Bukit Timah.

E. setigera Nees. Dense jungle, Bukit Timah, Chan Chu Kang, Chua Chu Kang, Jurong.

Hygrophila salicifolia Nees. "Chukal." Herb about 2 feet, flowers lilac, ditches, common. Garden lake, Tanglin, Bukit Timah road, Changi.

H. quadrivalvis Nees. Changi, Bukit Mandai.

Ruellia repens L. Erect or creeping in grass, flowers pale lilac with darker marks in the throat. Very common, Tanglin Changi, Bajau, Selitar, etc.

Acanthus ebracteatus Vahl. "Jeruju." A holly-leaved plant with white or blue flowers. Common in tidal mud. Kandang Kerbau, Tanjong Pagar, Alexandra Road, Changi, etc.

A. volubilis Wall. Twining, leaves not prickly flowers white. Not common, Bajau, Kranji, Chan Chu Kang.

Asystasia intrusa Bl. Straggling plant 3 feet tall or less, flowers pale violet. Hedges and thickets. Fort Canning, Government Hill, Tanglin, Chua Chu Kang.

Eranthemum album Nees. Flowers white, Jungles, local, Changi, Chan Chu Kang, Ponggol, Selitar, Choa Chu Kang.

(*E. Andersoni* Masters, described from a plant obtained in Singapore by T. Anderson, is only cultivated here.)

Justicia adrographioides Clarke. A straggling herb, with pale yellow flowers, leaves veined with white when young. Damp woods, Bukit Mandai, Chan Chu Kang.

J. Gendarussa L. "Ganda Rusa." A common shrub round villages, usually an escape from cultivation.

Adhatoda vasica Nees. "Singapore, Flor. Brit. Ind." Not seen even cultivated.

Peristrophe acuminata Nees. Common herb with pink flowers. Ang Mo Kio, Choa Chu Kang, Tanglin.

P. montana Nees. "Noja." Flowers pink, larger than the last. Leaves used for dyeing eggs, cakes, etc., pink. Tanglin, Blakang Mati, Jurong.

VERBENACEÆ.

Lantana Camara L. "Tahi Ayam." All over Singapore, very common. There are several color varieties, the commonest is orange red color, turning orange yellow when passing over; another form is pale pink with a yellow eye turning darker pink, and where these two forms grow together there is an intermediate or hybrid form. There is a slight difference in the form of the lower lip in the two forms, in the orange one the lip is shorter and broader than in the pink one, where it is nearly quadrate, so that the pink flower appears more irregular than the orange one. The plant is a native of South America.

L. indica Roxb. A smaller shrub with lilac flowers, and dark pink fruits. Waste ground near town, abundant, Rochore, Kalang, Balestier plain.

Lippia nodiflora Rich. Prostrate herb, flowers lilac. Waste ground, Rochore.

Stachytarpheta indica Vahl. "Selasih Dende." Common shrub, flowers blue. Waste ground, everywhere.

(*S. mutabilis*, much bigger, with rosy flowers, introduced here and there.)

Geunsia farinosa Bl. (Wallich, No. 1836); not seen.

(*Callicarpa Reeresii* Wall. Singapore, Murton in Fl. Brit. Ind. is cultivated only.)

C. longifolia Lam. Shrub, lilac flowers and white fruit. "Tampoh Besih." Common in hedges, Bukit Timah, Tanglin, Ang Mo Kio.

Premna. "Buas Buas." A group of shrubs with small white flowers, and black drupes. All very closely allied and difficult to distinguish.

P. cordifolia Roxb. Tanglin, Thomson Road.

P. parasitica Bl. Changi.

P. corymbosa Roth. Climber, Garden jungle.

P. flavescens var. *rubens.* Pasir Panjang.

P. coriacea Clarke. Jurong.

P. integrifolia var. *angustior.* A low prostrate plant, Serangoon River.

Gmelina villosa Roxb. "Bulang." A thorny shrub, with large yellow flowers, fruit a yellow acid plum. Common, Tanglin, Changi, Teluk Kurau.

G. Hystrix Kurz. occurs in the Garden road, possibly wild.

Vitex trifolia L. "Lagundi." Often planted, possibly wild at Bajau.

V. Negundo L. Bukit Timah Road, Bukit Mandai; probably an alien.

V. pubescens Vahl. "Alban." Tree, flowers blue, very common in secondary growth. Whole island.

V. vestita Wall. Tree, flowers yellow. Common in woods, Bukit Timah, Chan Chu Kang.

V. gamosepala var. Tree, rare, Changi.

Clerodendron inerme Gaertn. Shrub, flowers white stamens pink. Very abundant near the sea, Rochore, Changi, Selitar.

C. disparifolium Bl. "Guriam Padang." Small tree, flowers yellow, fruit black with a red calyx. The wood is used

for blackening the teeth. Very common in woods and thickets. Tanglin, Bukit Timah, Changi, etc.

Cl. deflexum Wall. A small shrub about 4 feet high with nodding heads of white flowers surrounded with numerous red sepals. Drupe black. Very common. Tanglin, Garden jungle, Chan Chu Kang, Tampenis.

Cl. paniculatum L. Shrub with brilliant crimson flowers. Mandai, Kranji. Doubtfully wild.

Cl. villosum Bl. Common shrub with white flowers. Whole island.

Cl. myrmecophilum Ridl. * A slender shrub, with the stem hollow and filled with ants' nests. Panicles large, flowers orange. A handsome plant, rare, streams at Choa Chu Kang. Several cultivated kinds also occur in waste ground near villages; such are *C. fallax* Lindl. *C. squamatum* Vahl. *C. fragrans* Vent. and *C. siphonanthus* Br. which is cultivated by Klings, who use the leaves for smoking instead of Hemp, and call it Ganja.

Cl. inerme florum Hassk. A white flowered species, introduced into Java from Singapore about 1855, I know nothing of, and *Cl. Colebrookianum* Walp. "Singapore Lobb" and *Cl. infortunatum* Gaertn. mentioned from Singapore also in Flor. Brit. Ind. I have never met with.

Sphenodesma pentandra Jack. "Akar Sulong." Not common, Changi.

Avicennia officinalis Bl. "Api-Api." Very common in mangroves and along tidal rivers. River Valley Road, Changi, Pulau Ubin, etc.

LABIATÆ.

Coleus atropurpureus Benth. Flowers bright purple. Open country. Ang Mo Kio, Chan Chu Kang.

Hyptis suaveolens Poit. Very common in waste ground. Sepoy Lines, Tanjong Katong, Mt. Faber, Changi, etc.

H. brevipes Poit. Common, Tanglin, Ang Mo Kio, etc. Both of these are introductions from South America, now thoroughly established.

Dysophylla auricularia Bl. "Ekor Kuching." Flowers pale lavender in long spikes. Very common in wet spots. Tanglin, Changi, etc.

Anisomeles ovata Br. Not common, Tanglin.

Leucas zeylanica Br. "Katumbet." A common weed with white flowers, waste ground. Tanglin, Blakang Mati, Selitar, etc.

L. linifolia Spr. Less common, Mt. Faber, Siglap.

Ocimum basilicum L. Basil. "Ruku-Ruku," often cultivated, occurs spontaneously in waste ground, as does also *Leonurus sibiricus* L. and *Leonotis nepetæfolia* Br.

PLANTAGINEÆ.

Plantago major L. "Ekor Angin." Waste ground, Chan Chu Kang, Tanglin, etc.

NYCTAGINEÆ.

Boerhaavia repens L. Sandy places, Galang.

AMARANTACEÆ.

Allmania nodiflora Br. Sandy spots. Changi, common.

Amarantus spinosus L. "Bayam Duri." Common weed in waste ground. Tanglin, Rochore, etc.

A. viridis L. "Bayam Itek." Common in waste ground, everywhere.

A. caudatus L. Cultivated, and often as an escape.

A. paniculatus L. Government Hill.

Cyathula prostrata Bl. Not rare, weed in waste ground. Bukit Timah, Pulau Ubin, Teluk Kurau.

Alternanthera sessilis Br. Common everywhere.

Pupalia atropurpurea Miq. Singapore (Wallich in Flor. Brit. Ind., but in Wallich's Catalogue it is labelled 6933 L. Singapore et Penang). Not seen here by me.

POLYGONACEÆ.

Polygonum flaccidum Meisn. Common in wet spots, ditches, etc. Tanglin, Bukit Timah Road, Rochore.

P. pedunculare Wall. Singapore. Wallich, not seen.

P. barbatum L. Ditches, Holland Road, Galang, Chan Chu Kang.

NEPENTHACEÆ.

The pitcher plants are known to the Malays as "Poko Priok Krah," (ape's cups). The stems of the stouter kinds are used for binding fences. They always occur in open country, borders of woods, etc., and are absent from dense jungle.

N. ampullaria Jack. A common kind with the pitchers in whorls often sunk in the ground, pitchers green, or more or less spotted with purple. I once found a plant with ivory white pitchers. Tanglin, Chan Chu Kang, etc.

N. Rafflesiana Jack. Pitchers often very large. Common all over Singapore.

N. phyllamphora Willd. Not common, Changi, Jurong.

N. Reinwardtii Miq. Common, Bukit Timah, Changi.

N. gracilis Korth. Blakang Mati, Changi, Bukit Timah.

N. albomarginata Lobb. "Singapore, Wallich." Surely an error for Penang, where it is abundant.

ARISTOLOCHIACEAE.

Aristolochia unguiflora Mast. A climber with large trilobed leaves and purple flowers. Local in long wet grass. Jurong.

Thottea grandiflora Rottb. "Seburut." A low shrub, 2 feet tall with rough hairy leaves, and bell-shaped flowers as big as a tumbler, hairy with raised veins outside, smooth deep purple inside. A very curious plant. Common in dry jungles, Bukit Timah, Reservoir woods, Bukit Mandai, Chan Chu Kang, Bajau.

Th. dependens Klotsch. Rare, Sungei Buluh.

PIPERACEÆ.

Piper (*Muldera*) *Maingayi* Hook. fil. Climber, rarely flowering. Common. Jungles, Bukit Timah, Chan Chu Kang.

P. (*Cubeba*) *sumatrana* Cas. Not common, Reservoir woods.

P. pedicellosum Wall. Rare, Chan Chu Kang.

P. muricatum Bl. An erect herb. Not very common, Bukit Timah, Chan Chu Kang, Jurong.

P. (*Charica*) *caninum* Bl. "Lada Hantu." Slender climber, common in woods. Garden jungle, Selitar, Kranji, Pulau Tekong.

var. *lanata*. Less common, in more exposed spots. Siglap, Chan Chu Kang, Pulau Ubin.

var. *angustifolium*. Garden jungle, Changi.

P. chaba L. "Bakek." Cultivated. I have also what may be a wild form of this under the name "Bakek hutan" from Bukit Mandai, (5851).

P. sarmentosum "Chabei." "Kadok." An erect herb with long runners. Common in orchards, villages, etc., all over Singapore.

(*P. Betel* L. "Sirih," and *P. nigrum* L. "Lada hitam" are often cultivated.)

P. miniatum Bl. "Sirih Ayer." Climber, fruit-spikes red. Woods, not rare, Reservoir woods, Bukit Mandai, Toas, Chan Chu Kang.

P. rostratum Roxb. Erect, rare, Bukit Timah.

P. porphyrophyllum E. Br. A well known ornamental climbing plant, leaves deep green spotted white and pink. Common but rarely flowering, dense woods, Bukit Timah, Selitar, etc.

(*Peperomia exigua* Miq. A little weed in gardens, on walls, etc., introduced. Tanglin, Chan Chu Kang).

CHLORANTHACEÆ.

Chloranthus officinalis Bl. Shrublet, with slender spikes of white flowers and translucent white berries. Damp ravines in jungles, local but abundant. Bukit Timah, Bukit Mandai, Jurong.

MYRISTICACEAE.

The wild nutmegs are very plentiful in Singapore, occurring in all the bigger jungles, but almost invariably in an isolated manner, so that it is often by no means easy to get both sexes of any species. They are all trees, varying in height from about fifteen feet to 100 or more. The seeds seem to be (in all but *M. cinnamomea*) deficient in aromatic properties, and are not used by the natives at all. The timber is often good. The native name for the cultivated Nutmeg is "Pala," the Mace being called "Bunga Pala," (literally flowers of Nutmeg). Many of the wild species are called "Pala Hutan," etc.; but "Pendarah," with the local variants Menarah, Mendarah, and Chendara, is the common name for other species.

M. elliptica Wall. Common, Bukit Timah, Bukit Mandai, Chan Chan Chu Kang. *var.* Bukit Mandai, Chan Chu Kang.

M. bracteata De C. A very large tree, rare, Bukit Timah.

M. cinnamomea King. Not common, Bukit Mandai, Sumbawang, Changi, Selitar.

M. crassa King. Flowers orange, Garden jungle, Bukit Mandai, North Selitar, Sungei Morai.

M. Lowiana King. Rare, Kranji.

M. inera Bl. Rare, woods, Bukit Mandai.

M. ferruginea Wall. (Cat. 6803.) Rare, Selitar.

M. superba Hook. fil. Rare, Sungei Bengkuang, Toas.

M. rubiginosa King. Rare, Garden jungle, Mt. Faber.

M. Wallichii Hook. fil. Bajau (3361), also collected by Cantley without locality.

M. sucosa King. Rare, Kranji (6558).

M. Farquhariana Wall. Common, Garden jungle, Bajau, Selitar.

M. Forbesii King. Selitar.

M. biralris Hook. fil. Very rare, a single male tree in the Botanic Gardens, probably planted, but not known elsewhere.

M. crassifolia Hook. fil. Bukit Mandai, Chan Chu Kang, Bajau.

M. Irya Gaertn. Rare, Garden jungle.

M. majuscula King. Not rare, Tanglin, Cluny road, Bukit Timah, Selitar.

M. brachiata King. Singapore (Wallich); not seen.

M. polysphærula Hook. fil. Not rare, Jurong, Chan Chu Kang, Kranji.

M. oblongifolia King. Rare, Bukit Timah.

M. conferta King. Bukit Mandai, Changi.

M. Wrayi King. Rare, Sungei Jurong.

M. intermedia Bl. The commonest species. Tanglin, Changi, Bukit Timah.

M. laurina Bl. Common, Garden jungle, Bukit Timah.

M. glauca Bl. Garden jungle, Kranji, Pulau Ubin.

M. glaucescens Hook. fil. Cluny Road.

M. Hookeriana Wall. Usually about 20 feet tall, with large leaves covered when young with brown wool which peels off as the leaves become coriaceous, fruit covered with brown wool. Not rare, Tanglin, Bukit Timah, Chan Chu Kang, Choa Chu Kang.

M. Cantleyi Hook. fil. Bukit Timah.

M. longifolia Wall. Bukit Timah.

M. penduliua Hook. The only tree of this species known is in the Botanic Gardens, but must have been planted.

MONIMIACEÆ.

Matthea sancta Bl. "Churom." A large shrub with small yellow flowers and steel blue fruits. The Jakuns smoke the leaves with tobacco to cure headaches. Common in woods and thickets, Garden jungle, Bukit Timah, Chan Chu Kang, Ang Mo Kio.

LAURINEÆ.

Trees, more rarely shrubs, with usually unisexual flowers A difficult group, owing to the difficulty of getting flowers of both sexes and fruits, many being imperfectly known. The trees are usually called "Medang" by the Malays.

Cryptocarya Griffithiana Wt. "Medang Buaya." Medium sized tree, with hairy yellow flowers. Not rare, Tampenis, Changi, Selitar, river, Changi Teban.

C. impressa Meissn. "Munjuat." A tall tree. Rare, Garden jungle.

C. ferrea Bl. Chan Chu Kang, Choa Chu Kang, Bukit Mandai. And two other species.

Beilschmiedia malaccensis Hook. fil. Rare, Bukit Timah.

Dehaasia microcarpa Bl. Sungei Jurong.

Cinnamomum javanicum Bl. Not rare in dense woods, but very rarely flowering. Garden jungle, Bukit Timah, Ang Mo Kio.

C. iners Reinwdt. A medium sized tree, never tall, common in open country. The young leaves are red and yellow and appearing just before flowering give the tree a fine appearance. The flowers are yellow and fœtid, the fruit blue-black. The bark is but feebly aromatic. Whole island, Tanglin, Changi, etc.

C. nitidum Bl. Very much like the last, but with larger flowers. Not common, Tanglin.

Phœbe opaca Bl. A big tree, flowers yellow, fruits black on swollen red peduncles. Garden jungle, Bukit Mandai.

Ph. declinata Nees. "Singapore, Wallich." Not identified.

Ph. sumatrana Miq. Changi (1811).

Machilus rimosus Bl. Changi (4707).

Alseodaphne decipiens Hook. fil. Small tree, flowers yellow, fruit obovate green with white spots. Garden jungle, Chan Chu Kang.

A. umbelliflora Hook. fil. Not common, Selitar, Chan Chu Kang.

A. costulis Nees. and *A. lucida* Nees. collected in Singapore by Wallich Nos. 2594 B and 2590, are entirely doubtful plants.

Actinodaphne pruinosa Nees. Botanic Gardens.

A. Maingayi Hook. fil. Dense woods, Bukit Timah.

Litsea grandis Bl. Near Tyersall, Bukit Mandai.

L. amara Bl. Jurong, Pulau Ubin.

L. penangiana Hook. fil. Common, flowers white, fruit white in a green cup. Woods, Tanglin, Bukit Timah.

L. myristicæfolia Wall. Siglap, Changi.

L. Panamonja Ham. Rare, Garden jungle.

L. longipes Meissn? "Mullay." Rare, Balestier Road.

L. ferruginea Bl. Garden jungle, Bukit Arang.

L. zeylanica Nees. A large bush, common on the sea coast. Changi, Pulau Ubin, Bedoh.

L. salicifolia Roxb. Garden jungle.

L. polyantha Juss. Chan Chu Kang, Kranji, Changi.

L. petiolata Hook. fil. Garden jungle.

L. nitida Bl. Bukit Mandai.
And a number of unidentified species.

Lindera malaccensis Hook. fil. Small tree, flowers yellow. Abundant in woods, Garden jungle, Tanglin, Bukit Timah, Chan Chu Kang, etc.

L. sp. "Perawas." Tree, leaves used medicinally. Galang, Garden jungle.

Cassytha filiformis L. A leafless twining parasite. Common near the sea, Blakang Mati, Changi, Chan Chu Kang, etc.

Hernandia peltata Meissn. Singapore, Wallich No. 7811. Not seen.

PROTEACEÆ.

Helicia petiolaris Benn. Tree, common in woods. Bukit Timah, Jurong, Woodlands, Kranji, Changi, Garden jungle.

H. excelsa Bl. "Membatu Laiang." Not very common, Changi, Chan Chu Kang.

THYMELEACEÆ.

Aquilaria malaccensis. The Gaharu, is rare here. I have only seen it at Kranji.

A. grandiflora. Rare, Bajau.

A. sp. A medium sized tree with small white flowers and very small fruits. Garden jungle.

Gonystylus Maingayi Hook. fil. This aberrant tree is now referred by some botanists to Tiliaceæ. It occurs in the Garden Jungle, Bukit Mandai and Chua Chu Kang.

Wikstroemia indica. "Singapore, Lobb;" doubtless an error.

SANTALACEÆ.

Henslowia Lobbiana De C. Climber. Common near the coast, Changi, Kranji, Chan Chu Kang.

H. bucifolia Bl. Apparently a root parasite. It is a twiggy, often nearly leafless shrub, entirely bright yellow. Berry at first yellow, then red and finally black. Dry woods near the sea, Bajau, Changi, Kranji, Sungei Buluh.

Scleropyrum Maingayi Hook. fil. "Rukam puteh." A shrub or small tree with stout spines, flowers greenish yellow in dense spikes, fruit pear-shaped green juicy when ripe. Woods, not rare, Tanglin, Changi, Kranji, Bukit Mandai, Selitar.

Champereia Griffithiana Planch. "Chemperei." A shrub with white branches, small light brown flowers and orange fruit. The leaves are eaten as a vegetable, but it is said to be poisonous to dogs. Sandy spots on the coasts, Changi, Tampenis, Selitar, Bajau.

Linostoma pauciflorum Griff. A slender climber with light yellowish green flowers enclosed in greenish cream colored bracts. Common, Garden jungle, Blakang Mati, Bukit Timah, Changi, Loyang.

L. scandens King. "Akar kareh hitam." A scandent shrub or tall climber. Common, Garden jungle, Changi, Chan Chu Kang.

LORANTHACEÆ.

These parasites are often very destructive to trees in gardens. They are called by the Malays "Api-Api" or Senalu, with its variants Bendalu, Ndalu.

Loranthus Lobbii Hook. fil. A variety with red, not yellow flowers. Changi, Chan Chu Kang.

L. coccineus Jack. Bukit Mandai.

L. ferrugineus Roxb. Common, Tanglin, etc.

L. longiflorus Desr. Flowers crimson-scarlet. On a very lofty tree, Bukit Timah.

L. pentandrus L. A big stout plant, flowers light pinkish red; parasitic on Eugenia. Gardens, Alma, Bukit Timah, Chan Chu Kang.

L. albidus Bl. Flowers white, rare, Bukit Timah.

L. retusus Jack. On *Rhodomyrtus* and *Eugenias*, near the sea. Changi, Blakang Mati. Pulau Tekong, Jurong.

L. ampullaceus Roxb. Flowers green and black. Very common, Tanglin, Changi, Chan Chu Kang.

L. crassus Hook. fil. Gardens, Changi.

L. Maingayi Hook. fil. A very curious little flowered species, flowers brown. Rare, Kranji (6923).

Viscum articulatum Burm. Parasitic on *Loranthi*. Common, Tanglin.

V. orientale Willd. On *Ficus*, and *Macaranga javanica*. Common, Rochore, Bukit Timah, Jurong, Chan Chu Kang, etc.

EUPHORBIACEÆ.

Euphorbia atoto Forst. A shrubby plant, sea coasts, Changi.

E. pilulifera L. "Gelang Susu." Common weed in waste ground, everywhere.

E. thymifolia Benn. Prostrate weed, waste ground, paths, etc. Common, Tanglin, etc.

(*E. Tirucalli* L. A large succulent shrub, often cultivated, occurs as an escape. The milk is used in native medicine, and for putting into the wounds made for marking

cattle to make the marks permanent. Said to be a native of Africa.)

Aggneia bacciformis Muell. A little shrubby plant, in grass, sea-shore. Teluk Kurau.

Bridelia tomentosa Bl. "Kenidai." Shrub or small tree. Garden jungle.

B. pustulata Hook. fil. Shrub. Jurong, Selitar.

Cleistanthus laxis Hook. fil. Tree, Garden jungle, Changi.

Cl. myrianthus Kurz. Bushy tree with coppery leaves. Kranji road, near Stagmount, Jurong, Chan Chu Kang.

C. hirsutulus Hook, fil. Rare, Bukit Timah.

C. macrophyllus Hook. fil. Rare, Bukit Timah.

C. nitidus Hook. fil. "Singapore, Lobb"; doubtless Penang.

Actephila javanica Miq. Wallich 8016. A shrub with very small greenish white flowers. Common, Garden jungle, Bukit Timah, Bukit Mandai.

Phyllanthus pectinatus Hook. fil. "Laka, Malakka." A handsome tree with a trunk like a yew and elegant feathery foliage. The fruit a yellowish green angled drupe, acid, and used for preserves and in curries. The town of Malacca is said to take its name from the tree. Common in woods, Bukit Timah, Chan Chu Kang, Mandai.

P. coriaceus Wall. "Singapore, Wallich 7946." Not seen only known from Wallich's collection.

P. pulcher Wall. *Reidia glaucescens* Miq. Small shrub, sometimes cultivated as an ornamental plant, possibly wild, but usually seen about cultivated ground. Tanglin.

P. maderaspatensis L. A small weed. Changi.

P. niruri Wall. "Dukong Anak Merah." Common weed. waste ground, Tanglin, Galang, Changi.

P. urinaria L. "Dukong Anak." Common weed everywhere, used medicinally, and it is also supposed that after chewing a bunch of this plant it is possible to bite up glass with impunity.

(*P. distichus* Muell. *Cicca acidissima* is sometimes cultivated.)

Glochidion. Trees with inconspicuous flowers. "Ubah," of the Malays.

G. littorale Bl. Banks of tidal rivers. Chan Chu Kang.

G. goniocarpum Hook. fil. Not rare, Tanglin, Bukit Timah, Galang.

G. desmogyne Hook. til. Rare, Bukit Timah, Selitar.

G. insulare Hook. fil. Not rare, Selitar, Bukit Mandai, Toas, Jurong, etc.

G. brunneum Hook. fil. "Ubah Merah." Gardens, Bukit Timah.

G. desmocarpum Hook. fil. Not common, Tanglin, Bajau.
G. levigatum Hook. fil. Bukit Timah, Sungei Bruang, Bukit Mandai.

G. microbotrys Hook. fil. Tall tree with flaking bark. Flowers very small scented of cucumbers. Gardens, Chan Chu Kang, Changi, Pulau Ubin.

G. superbum Baill. Small tree with large leaves. Common in open country all over Singapore.

G. leiostylum Kurz. Common, Gardens, Selitar.

G. coronatum Hook. fil. Rare, Jalan Bray.

Breynia rhamnoides Muell. Large shrub. Eskbank (Hullett).

B. discigera Muell. Rare, Upper Bukit Timah.

B. reclinata Hook. fil. "Hujan Panas." A shrub conspicuous from its bright red berries, but why called Hujan Panas,

lit. warm rain, no one seems to know. Very common, especially near the sea, Tanglin, Reservoir, Changi, etc.

Sauropus albicans Bl. "Chekop Manis." A small shrubby plant with dark green leaves with a white central blotch, red flowers and pink or white fruit. A popular native vegetable, leaves eaten as spinach. Waste ground, common.

Cyclostemon longifolius Bl. A tree with pendent branches and large leathery leaves. Rarely met with in flower. Common in woods, Garden jungle, Selitar.

Choriophyllum malayanum Benth. Sandy spots near the sea. Rare, Seremban; also collected by Wallich, 7975.

Aporosa ficifolia Baill. Not rare, Bukit Timah, Chan Chu Kang, Garden jungle.

A. nigricans Hook. fil. Tanglin, Bukit Timah, Bukit Mandai.

A. Maingayi Hook. fil. A shrub, Garden jungle, Selitar, Kranji, Jurong.

A. fruticosa Muell. A bush. common, Tanglin, Tanjong Gol, Chan Chu Kang.

A. Praineana King. Bukit Mandai, Selitar, Kranji.

A. Benthamiana Hook. fil. Tree, about 40 feet tall, with red showy fruits. Not rare, Tanglin, Bukit Timah, Chan Chu Kang.

A. lunata Benth. Not common, Jurong.

A. stellifera Hook. fil. Garden jungle, Kranji, Bukit Timah.

A. fulcifera Hook. fil. Not common, Jurong, Toas.

Daphniphyllum laurinum Baill. "Ruas-Ruas jantan." A big shrub or tree with white flowers, and olive shaped green fruits. Usually near the sea, Changi, Kranji, Teban, Siglap.

Antidesma velutinosum Bl. Shrub with racemes of pink fruits. Common, Garden jungle, Changi, Pulau Ubin, etc.

A. cuspidatum Muell. "Sebasah." A big shrub, common in thick woods, Bukit Timah, Changi, Bukit Mandai, Teban, Reservoir woods.

A. fallax Meisn. Not common, Bukit Timah.

A. alatum Hook. fil. Thick woods, common, Bukit Timah, Changi, Bukit Mandai, Jurong.

A. bunias Spreng and *A. ghaesembilla* Gaertn. mentioned in Flora Brit. Ind. **I have not seen wild.**

Baccaurea. A genus of trees of no great size, with flowers in long scented racemes. Fruit usually a capsule, orange colored or brown, splitting and disclosing the seeds enwrapped in an orange pulp hanging from the placentas; sometimes the fruit is a berry, and does not split. Most are more or less eatable though often acid.

B. parviflora Muell. "Setambun." A small tree with a knotted stem, and very hard compact yellow wood, used for making sticks. The male flowers are borne in racemes in tufts on the stem, they are yellow and smell like cowslips. The female racemes are borne at the foot of the tree, so as to lie on the ground. The fruit is a spindle-shaped berry, claret colored and eatable though acid. A common plant. Tanglin, Bajau, Changi, etc.

B. macrophylla Muell. Tree small or medium. Fruits globose dull orange russet, pulp of seed orange, sweet. Garden jungle, Selitar.

B. motleyana King. "Rambai." A well known fruit, common in cultivation and apparently also wild.

(*B. Malayana* King. "Tampoi." Occurs in cultivation but is not common.)

B. bracteata Muell. A small tree. Common, Bukit Mandai, Holland Road, Kranji.

B. latifolia King. Garden jungle (6264).

B. sp. B. in Flor. Brit. Ind. Garden jungle, Kranji.

B. reticulata Hook. fil. Kranji, Selitar.

B. Kunstleri King. A fair sized tree, fruits ochreous, with orange pulp. Common, Garden jungle, Selitar, Tanjong Gol.

B. minor Hook. fil. Fruit as big as a cherry, ochreous pulp orange. Garden jungle, Bukit Timah.

B. symplocoides King. A small tree, fruits orange, aril crimson. Garden jungle, Chan Chu Kang.

B. sp. Tree with narrow lanceolate acute leaves, flowers green. Garden Jungle (6263).

Microdesmis casuarifolia Planch. A small tree, flowers bright yellow, berries red. Thick woods, common, Garden jungle, Changi.

Galearia. Low shrubs with long slender spikes of very small flowers, fruits white pulpy. The species are all very much alike and difficult to distinguish.

G. affinis Benn. Woods. Garden jungle, Changi, Bajau.

G. Wallichii Br. Changi (Hullett).

G. subulata Muell. Garden jungle.

G. phlebocarpa Br. The commonest species. Garden jungle, Bukit Timah, Chan Chu Kang, Pulau Ubin.

G. sp. with the leaves pubescent beneath, shoots and racemes covered with black pubescence. Changi, Siglap.

(*Jatropha curcas* L. "Jarak Blanda." Occurs in and near villages.)

(*J. gossypifolia* L. A garden escape, occurs here and there).

(*Aleurites Moluccana* Willd. Candle nut Singapore nut, Kamiri, Buah Kras, is often cultivated).

Croton argyratus Bl. A shrub, leaves silvery beneath. Local, Batu Putih, Changi.

C. caudatus Geisel. "Tuku Takal." There are two forms, if they are not specifically distinct here, one a long stout woody liana with rough greenish capsules. Common at Tanglin, Chan Chu Kang. The other a scandent or erect shrub with erect racemes of white flowers and hard globose yellow capsules as big as a bullet.

Common in open country. Tanglin, Bukit Timah, Bajau, Changi.

C. Griffithii Hook. fil. A common shrub in woods. Garden jungle, Bukit Timah, Sungei Buluh, Chan Chu Kang.

C. oblongifolium Roxb. Bukit Mandai, Selitar.

Trigonostemon longifolius Baill. A small shrub. Not common, Chan Chu Kang, Kranji Road.

Ostodes macrophyllus "Kayu Julong." A tree, rare, Bukit Panjang (common in Malacca).

O. muricata var. *minor* and *Dimorphocalyx capillipes* Hook. fil. "Singapore Lobb"; evidently an error for Penang.

Agrostistachys filipendula Hook. fil. A big stiff shrub. A gum which exudes from the buds was formerly collected for making a resin for polishing sheaths of Krises. Local. Sandy spots near Changi.

A. longifolia Benth. var. *Malayana*. "Julong Julong." A low little or unbranched shrub, with large erect stiff leaves, used for thatching and wrappers. The Singapore plant is very different from that of Pahang and Perak, which is a much larger branched shrub. Common in woods. Tanglin, Sungei Bulah, Chan Chu Kang, etc.

Claoxylon indicum Hassk. A large shrub. Thickets, Grange Road.

Cl. longifolium Muell var. *brachystachys*. Woods, not rare, Bukit Timah, Pulau Ubin, Bukit Mandai, Chan Chu Kang.

Acalypha indica L. A weed, common in waste ground. Bajau, Galang, Pulau Ubin, Teluk Kurau.

Calodepas ferrugineum Hook. fil. A small tree with long slender yellow flower spikes, and capsules covered with brown wool. Garden jungle (5991, 6481), Bukit Timah.

Alchornea villosa Muell. "Ramin bukit.' A big shrub, the bark used for string. Common in thickets and edges of woods. Bukit Timah Road, Reservoir woods, Chan Chu Kang, Bukit Mandai.

A. rugosa Muell. Common, Changi, Serangoon.

Mallotus macrostachyus Muell. A big shrub. Thickets, Bukit Timah Road at the 9th mile.

M. Cochinchinensis Lour. "Balik Angin." A small tree, pretty when in flower from its pendent white racemes. The under side of the leaves is white, so that when blown by the wind the whole tree appears white, whence the native name. A fairly good fibre can be obtained from the bark. Common in open country, Tanglin, Kranji, etc.

M. penangensis Muell. Not common, Bajau, Toas, Sungei Morai.

M. philippinensis Muell, and *M. barbatus* Muell, given in Flor. Brit. Ind. as from Singapore; (the latter collected by Lobb) are doubtless errors.

M. vernicosus Hook. fil. "Singapore Botanical Garden, Cantley" is altogether doubtful.

Macaranga hypoleuca Muell. A fair sized tree with white stems and white undersides to the leaves. Sticks of its wood are used for setting gambier. Common in dry woods and secondary growth, all over Singapore. "Mahang putih."

M. megalophylla Muell. "Kubin." A fair sized tree with very large leaves. The wood used for making windmills, hence its name. Selitar, Choa Chu Kang.

M. trichocarpa Muell. A shrub half scandent, with irritating prickly capsules. Dry woods, common, Tanglin, Bukit Timah, Changi.

M. javanica Muell. "Mahang." A common tree all over the island with reddish inflorescence, and small capsules bilobed smooth, and covered with a waxy coat. It is doubtful whether this is the same as the Javanese species. Open country and secondary growth, exceedingly common.

M. triloba Muell. A medium sized tree, leaves entire or three lobed. Young plants have red leaves, and look very handsome. Abundant all over Singapore, in woods, Tanglin, Changi, Pulau Ubin.

M. Lowii King. Not common, Jurong, Tyersall, Chan Chu Kang.

M. populifolia Muell. Big tree, in woods, Bukit Timah.

Ptychopyxis costata Miq. A big tree, flowers velvety yellow, fruit large green hairy wrinkled. Not common, Garden jungle, Chan Chu Kang.

(*Ricinus communis L.* "Jarak," Castor oil; occurs near villages.)

Endospermum moluccense Muell. "Sendok-sendok." A big tree, with smooth grey bark, flowers green very sweet, fruit as large as a pea, orange, sweet. The wood is used to make clogs. Not rare, Bukit Timah, Chua Chu Kang.

E. chinense Benth. Singapore, Wallich 7846; a doubtful specimen.

Gelonium multiflorum Juss. Woods, Changi, Bukit Timah.

G. bifarium Roxb. Sea coasts, Changi, Pulau Ubin.

Megistostigma moluccense Hook. fil. A stinging climber. Garden jungle.

Homalanthus populifolius Grah. Occurs here and there, about the Alexandra road and elsewhere, probably planted.

Sapium discolor Muell. A tall tree, very common, Tanglin, Jurong, Reservoir.

S. indicum Roxb. "Guring." Sea coasts, Kranji, Pasir Panjang.

Excœcaria agallocha L. A small tree full of poisonous milk, flowers green, very fragrant. Sea coasts, often growing between rocks. All round the coasts, Kranji, North Selitar, Toas.

Sebastiania chamælea Muell. A herb. Sandy spots, Changi, Blakang Mati.

URTICACEÆ.

Trema orientalis Bl. A common shrub in waste ground. Tanglin, Changi.

T. angustifolia Bl. Not common, Changi.

T. timorensis Bl. Very common, Tanglin, Chan Chu Kang.

Gironniera nervosa Planch. "Kasap." A big tree, with small bright orange-colored fruits. Common in woods, Tanglin, Chan Chu Kang, Changi.

G. subaequalis Planch. A big tree, less common, Tanglin, Chan Chu Kang.

G. parvifolia Planch. A small tree in dense jungle common in the hill districts of the peninsula, rare in Singapore, Bukit Timah, Kranji.

Streblus asper Lour. A climber with milky juice. Rare, Pulau Ubin.

Sloetia sideroxylon Teysm. "Tampenis." A big tree with dark brown heart wood, one of the best timbers in the region, being untouched by termites and unaffected by ordinary decay for a very long time. The wood when fresh cut exhales an unpleasant odor. Large trees are now scarce as the natives cut them when young to make carrying sticks, and gambier stirrers, etc. There is a good deal of difference in the size of the leaves

according to the age of the tree. Young shoots from an old stump usually have large leaves, and it seems to me that *S. penangiana* Oliv and *S. Wallichii* King are mere states of *S. sideroxylon*, Teysm. The natives however certainly draw a distinction between some forms calling *S. Wallichii*, Tampenis putih and *S. sideroxylon*, Tampenis Merah, i.e. red and white Tampenis. The plant flowers very readily, even seedlings in a pot sometimes flower and fruit when only a foot and a half tall. The fruit is a soft white drupe enclosed in the four thickened white sepals. These are sweet and eatable and any pressure on them ejects the fruit to some distance so that if a bird attempts to eat them the fruit is thrown out.

Common in dry woods, open country, etc., especially the broad leaved var. *penangiana* Tanglin, Chan Chu Kang, Changi, etc.

Ficus. The figs are tolerably well represented here, no less than 35 species occurring in the island. They comprise creeping shrubs, big climbers, erect shrubs from two feet tall to trees of great size. The figs, none of which here are eatable, are sought for by birds, especially pigeons, bulbuls and starlings, and by fruit-bats, which frequent the trees when in fruit in great numbers, and distribute the seeds everywhere. The common Malay name for any species of *Ficus* is "Ara." "Sipadik" is applied to many scandent species, and "Kelampong" to such trees as bear the figs clustered on the stem. Most of the trees are of rapid growth with soft valueless timber.

F. pisifera Wall. Small tree, figs white, common, Bukit Timah, Bukit Mandai, Pulau Ubin.

F. urophylla Wall. "Ara Supudeh." A shrub, often epiphytic on other trees and sometimes killing them, figs small orange. Very common, Tanglin, Bukit Timah, Chan Chu Kang.

(*F. bengalensis* L. A big tree, often planted.)

F. bracteata Wall. A medium sized tree, figs orange. Not rare near the sea, Changi, Batu Puteh, Chua Chu Kang.

F. annulata Bl. Climber or tree, figs large and orange. Rare, Bukit Timah.

F. globosa Bl. A bushy tree, figs dark green, common in thickets, Bukit Timah, Bukit Mandai, Changi, Toas, Reservoir.

F. xylophylla Wall. A small tree or epiphyte, figs 2 inches long orange with darker spots, very handsome. Not rare, Galang, Bukit Timah, Changi, Selitar.

F. obtusifolia. Rare, Pulau Ubin.

F. altissima Bl. Big tree. Garden jungle, Serangoon.

F. consociata Bl. Var. *Murioni.* A tree or large shrub, figs orange. Not rare on the coast, Changi, Selitar, Ponggol, Bukit Timah.

F. procera Bl. A big tree. Fort Canning, Changi.

F. microstoma Wall. Not seen. Singapore, Wallich 4566.

F. indica var. *Gelderi.* An epiphyte or tree. Selitar, Pulau Ubin.

F. sumatrana. Tree. Chan Chu Kang.

F. acamptophylla Miq. Big tree, not rare, Bukit Timah, Changi, Kranji, Bajau, Serangoon.

F. binnendykii. Mangrove swamps, Jurong, Kranji, Tampenis.

F. obtusifolia Roxb. Rare, Pulau Ubin (Hullett).

F. Benjamina L. "Waringin." Commonly cultivated.

F. glabella Bl. Big tree, figs small white with pink spots. Chan Chu Kang, Bedok, Bukit Timah.

F. retusa var. *nitida.* Tree. Galang, Changi, Bajau.

(*F. religiosa* L. Commonly planted.)

F. pisocarpa Wall. A big tree. Government House Grounds, Tanglin, Changi, Chan Chu Kang.

F. callicarpa Miq. A big climber with flattened stem, figs very large, pear-shaped orange with paler spots, very showy. On big trees, common, Bukit Timah, Chan Chu Kang.

F. punctata Thunb. Slender climber on old stumps. Tanglin, Chan Chu Kang, Selitar, Tanjong Gol.

F. apiocarpa Miq. Strong climber, figs pear-shaped large orange red. Tanglin.

F. obscura Bl. Figs yellowish white. Not rare, Bukit Timah, Chua Chu Kang.

F. laevis Bl. Rather rare, Bukit Timah, Pulau Ubin (Hullett), Chua Chu Kang.

F. recurva Bl. var. *ribesioides*. Bajau, Sungei Morai, Kranji, Chan Chu Kang.

F. ramentacea. Climber with yellow milk, figs bright pink. Dense woods, Bukit Timah, Chan Chu Kang.

F. villosa Bl. Climber, figs red or yellow, hairy. Tanglin, Bukit Timah, etc. Very common.

F. diversifolia Bl. Small shrub, terrestrial in sandy spots or epiphytic in mangrove swamps. Var. *ovoidea*. Very common, Changi, Kranji, Sungei Buluh, Teban, Selitar, Pulau Tekong.

F. Miquelii King. Medium to large tree, figs green with whitish spots, at length dull red in clusters on the stem. Very common, Tanglin, Bukit Timah, Bukit Mandai.

F. ribes Reinwdt. Singapore, Wallich; not seen.

F. fistulosa Reinwdt. Bukit Timah, Changi, Chan Chu Kang Pulau Ubin.

F. glandulifera Wall. Tree with spreading crown, figs yellow. Not very rare, Garden jungle, Changi.

F. alba Reinwdt. A shrub leaves lobed and large when young smaller and entire in older trees, white beneath, figs, yellow, becoming red. Very common in open country.

F. chrysocarpa Reinwdt. A small shrub with rough leaves and golden hairy figs. Common in open country everywhere. Dr. King calls this 10 to 30 feet tall, and distinguishes it from *F. hirta* by the latter being small and having lobed leaves. I have never seen this more than 5 or 6 feet tall, and the leaves are never lobed.

F. chartacea Wall. A very slender shrub with very small yellow figs. The bark is used for string. Common in thick woods, Garden Jungle, Changi, Bukit Mandai.

Artocarpus rigida Bl. "Tampunei." Monkey Jack. A very fine large tree with round yellow fruits covered with short spines and enclosing numerous seeds embedded in an orange colored sweet pulp. An excellent fruit. Tanglin, Changi, Chan Chu Kang.

A. Kunstleri King. "Getah Terap." A large tree, very variable in the shape of its leaves in young trees deeply lobed, in adults ovate oblong entire. The best is used for cordage, and as clothing by the Sakais. The milk is used as birdlime. Common all over Singapore.

A. Lowii King. Rare. Bukit Timah.

A. Maingayi King. Rare, Toas.

A. Scortechinii King. Not rare, Garden jungle, Kranji.

A. lanceæfolia Roxb. "Keledang." A very large tree with excellent timber. Not common, Tanglin, Changi.

A. Lakoocha Roxb. "Tampang Ambong." Not rare, Bukit Timah, Chan Chu Kang, Tanglin, Changi, Pulau Ubin.

A. Gomeziana Wall. "Tampang." A medium sized tree. Fruits smooth round, yellow and shining outside, inside rose pink, eatable but sour.

A. pedunculatis King. Rare, Bukit Mandai.

A. integrifolia L., the Jack, "Nangka;" *A. incisa* L., Bread fruit: and the "Sukun" said to be a variety of it; and *A. polyphema* Pers., the Champedak, are cultivated. The latter may possibly be wild at Changi.

A. sp. Large tree with pinnate leaves and fruit like that of *A. rigida*, probably undescribed. Garden jungle, Pulau Ubin, Bukit Timah.

A. sp. Medium sized tree with small leaves, and small green fruits with white flesh $1\frac{1}{2}$ inch long, seeds few Garden jungle.

Conocephalus suaveolens Bl. A big scrambling shrub with large leaves and compact heads of dirty white flowers, smelling of pears. Not rare, thick jungles, Bukit Timah, Bukit Mandai. Pulau Ubin.

C. amœnus King. Flowers pink. Dense jungles, Selitar, Pulau Ubin.

C. Scortechinii King. Singapore, Maingay, and *C. subtrinervius* Miq. collected by Lobb, probably erroneously localised.

Fleurya interrupta Gaud. A weed, sometimes stinging. Tanglin.

(*Pilea muscosa* Lindl. Introduced, common in waste spots in gardens, etc.)

Pouzolzia indica L. and var. *angustifolia*. "Ubai-Ubai." Used as a vegetable by the natives. A low weed, not very common, Bukit Timah, Chan Chu Kang.

P. pentandra Benn. A common weed, Tanglin, etc.

Pellionia javanica Wedd. "Singapore Lobb," doubtless an error for Penang.

Elatostema molle Wedd. Singapore, Wallich 4633; probably an error for Penang.

Pipturus mollissimus Wedd. Shrub. Rare, Toas.

JUGLANDEÆ.

Engelhardtia Wallichiana Lindl. Tree with winged fruits. Rare, Garden jungle.

E. serrata Bl. Rare, Changi.

MYRICACEÆ.

Myrica Nagi Thumb. "Gilinche." A small tree with dark green leaves and very small red drupes, much smaller than those figured in the Botanical Magazine t. 5727. Common on the sea coasts, Toas, Changi, Jurong, Blakang Mati; rarer inland, Bukit Timah.

CUPULIFERÆ.

Oaks and chestnuts are very abundant in Singapore, and are usually fairly large trees, the timber however is usually remarkably poor and valueless. When in flower, the small green blossoms are visited by myriads of small blue-bottle flies, with red heads. The fruits are sought for and dispersed by squirrels.

Quercus oidocarpa Korth. Not common, Garden jungle.

Q. *Wallichiana* Lindl. Jurong, Changi.

Q. spicata var. *graci ipes.* "Berangan Padi." Bukit Timah, Pulau Ubin.

Q. sundaica Bl. "Mempening Bagan." Not rare, Changi, Tengah.

Q. *Lamponga* Miq. Our commonest species. A medium sized tree with leaves silvery on the back. Very common. Tanglin, Changi, Chan Chu Kang. A form passing into *Q. Euryckii* occurs in many spots. Selitar, etc.

Q. hystrix Korth. "Mempening." Common Bukit Timah, Kranji, Chan Chu Kang, Toas.

Q. conocarpa Oudem. Common, Garden jungle, Reservoir, Changi.

Q. Bennettii Miq. Rare, Garden jungle, Bajau.

Q. Cantleyana King. Common, Tanglin, Bukit Timah, Chan Chu Kang.

Q. lucida Roxb. Common, Changi, Selitar, Bukit Mandai.

Q. encleisocarpa Korth. A big tree, acorns almost completely enclosed in the very thin cup. Common, Tanglin, Bukit Timah, Changi.

Q. cyclophora Endl. with very large disc-like acorns. Singapore, Wallich; not seen.

Castanopsis javanica De C. "Katek Tanga." "Berangan Gajah." A big tree with very large spiny chestnuts, uneatable. Common, Tanglin, Changi.

C. Wallichii King. Garden jungle, Bukit Timah, Chan Chu Kang. Changi, common.

C. hystrix Dr C. Rare, Toas.

C. Hullettii King. Involucre without spines but stout ridges on them. Nuts eatable and good. Garden jungle, Bukit Timah, Sumbawang, Bukit Mandai.

C. sp. Like the last, but the involucres are spiny, and leaves smaller. Garden jungle, Changi.

C. nephelioides King. Rare, Bukit Timah, Pulau Damar.

C. sumatrana De C. Singapore, Wallich 2762; not seen.

CASUARINEÆ

Casuarina equisetifolia Forst, "Ru", is often planted, and was possibly wild here formerly.

CONIFERÆ.

Dacrydium elatum Wall. "Singapore, Schomburgk" in Flor. Brit.Ind, must have been of course from a garden. The tree does not occur wild at much less than 2,000 feet altitude in the peninsula.

Podocarpus neglectus Bl. "Sintada." Common in mangroves, and all round the island, Kranji, Changi, Jurong, Seragoon.

P. neriifolia Don. Sea coasts, Changi.

Agathis loranthifolia Salisb. Very rare, a few young plants in a wood near Changi. This Damar tree is usually to be met with only at an altitude of about 2000 feet in these latitudes, but both at Changi, and in the low country of Siak, Sumatra, I have found small plants growing far in the jungle.

GNETACEÆ.

Gnetum neglectum Bl. A big climber, fruit apricot color. Common in forests, and in woods near the sea. Garden jungle, Chan Chu Kang, Kranji, Bajau, Pulau Tekong.

G. macrostachyum Hook. fil. Not rare, Bukit Timah, Changi, Jurong, Selitar.

G. funicu'are Bl. A big climber, the bark used for making string. Common, Tanglin, Sumbawang, Kranji.

G. edule Bl. Rare, near Selitar.

CYCADACEÆ.

Cycas Rumphii Miq. Sandy spots by the sea. Changi, Toas.

MONOCOTYLEDONES.

HYDROCHARIDEÆ.

Hydrilla verticillata Casp. A common water weed in ditches Tanglin, Chan Chu Kang.

Blyxa malaccensis Ridl. An aquatic with grassy leaves. Tanglin, Chan Chu Kang.

Enhalus Koenigii Rich. "Setul." A marine plant with long strap-like leaves. The male flowers are very small and white, borne in a pair of large green boat-shaped bracts on the end of a long stalk. When fully developed the inflorescence rises to the surface, and the flowers break off and float away till they come in contact with a female flower which they fertilise. The sea is sometimes sprinkled all over with them. The female flowers are solitary in the bracts. After fertilization the stalk contracts into a spiral and the fruit is drawn down to the bottom of the sea to ripen. It is ovoid, green and hairy, about $1\frac{1}{2}$ inch long. Malay children eat it. The Dugong (*Halicore*) lives mostly on the leaves of this plant. It is very abundant in shallow bays in the Johore Strait, round Blakang Mati and wherever the sea is shallow enough for it.

Halophila ovata Gaud. A small creeping marine plant with obovate leaves. Abundant in shallow bays in mud. Changi, Blakang Mati.

BURMANNIACEÆ.

Burmannia coelestis Don. "Sisik Naga." A slender little plant with blue urn-shaped flowers, in grassy spots, common. Tanglin, Pasir Panjang, Mt. Faber.

B tuberosa Becc. A small white saprophyte, usually almost completely buried in the ground. Flowers white with yellow corolla lobes, scented of cowslips. Damp

jungle in rotten leaves, Chan Chu Kang, Bukit Timah, Bukit Mandai.

Thismia Aseroe Becc. A saprophyte, with urn-shaped flowers, the perianth lobes drawn out into tails yellow. Decaying leaves in wet jungles. Fairy point, Changi (Beccari), Bukit Timah, Kranji.

Th. fumila Ridl.* Somewhat like the last but smoky grey. Rare, Chan Chu Kang.

Gymnosiphon borneense Becc. An exceedingly fragile little plant, with lavender flowers. Dense jungles in rotten leaves, Bukit Timah, Chan Chu Kang.

Orchideæ.

Oberonia. Small epiphytic orchids with ensiform distichous leaves and slender spikes of very small green, yellow or red flowers.

O. dissitiflora Ridl.* Mangroves, Kranji.

O. lunata Lindl. On a high tree, Selitar, Bukit Timah.

O. anceps Lindl. Galang, Kranji.

O. miniata Lindl. "Singapore cultivated in Loddiges Garden," has not been seen here of late years, and is probably an error of locality.

O. ciliolata Hook. fil. Mangrove swamps and orchard trees. Kranji, Chan Chu Kang, Changi, Sungei Morai, Bukit Timah.

Microstylis. Terrestrial orchids, with the stems usually swollen at the base, thin-textured leaves, and small red green or yellow flowers.

M. micrantha Hook. fil. A creeping plant with a rather long cylindric stem, and lanceolate copper colored leaves, which "sparkle like the stone avanturine." Flowers very small red and yellow. On dead leaves, Bukit Mandai, Changi, Selitar.

M. congesta Rchb. f. Stem swollen at the base, flowers pink or green. Common in woods, Bukit Timah, Kranji, Sungei Pandan.

Liparis venosa Ridl. The finest in the genus. Flowers fairly large, petals and sepals pink, lip with dark red veins. Terrestrial. Woods, very rare. Chan Chu Kang.

L. nervosa Lindl. Flowers yellow or purple. Terrestrial in swamps among grass in water Changi, Ang Mo Kio. near the Reservior, Tanglin.

L. elegans Lindl. Epiphytic, with stiff leaves, and racemes of small yellow flowers with a red lip. Common on old stumps and trees near the sea. Selitar, Kranji.

L. disticha Lindl. Epiphyte. The flowers crowded to the end of the raceme with distichous bracts; small, opening one at a time, apricot colored. Common. Mangrove swamps. Kranji, Chan Chu Kang, etc.

Platyclinis longifolia Hemsl. Epiphyte, forming large tufts, with conical pseudobulbs, long narrow leaves and long nodding spikes of brown flowers. It is easy to cultivate, and flowers all the year. Dry woods near the sea, Kranji, Sungei Jurong.

Dendrobium longicolle Lindl. * Epiphytic, forming a tuft of long slender pseudobulbs, bearing one leaf apiece, flowers sol tary on long stalks with long filiform petals and a yellow lip. Rare, growing with the last. Sungei Morai. First discovered by Cuming.

D. (Bolbidium) pumilum Roxb. A little tufted plant with two leaves to each stem and one or two small flowers, yellow or veined with purple. Not rare on trees. Mangrove swamps, orchards, etc. Kranji, Bajau, Selitar.

D. (Sect. *Desmotrichum*) *lonchophyllum* Hook. fil. Stems branched and swollen at intervals. Flowers small and fugacious, yellow with pink stripes. Common all over Singapore.

D. crinifernm Lindl. Flowers yellow spotted purple, lip with

many yellow filaments on the end. Mangroves. Kranji, Sungei Morai, Changi.

D. Kunstleri Hook. fil. Flowers cream color with pink spots Bukit Timah, Kranji, Changi.

D. pallidiflorum Ridl.* Flowers yellowish white. Rare. Kranji.

D. laciniosum Ridl.* Flowers yellowish. Rare, Pulau Selitar.

D. (Sect. *aporum*) *Serra* Lindl. Stems flat covered with opposite distichous triangular leaves sometimes red, flowers very small, white. Common, Kranji, Changi, etc.

D. sinuatum Lindl. Stems as the last, but leaves longer; flowers orange small. Common, Selitar, Kranji.

D. eulophotum Lindl. Flowers yellow striped red. Common, Kranji, Bajau.

D. rhizophoreti Ridl. Mangroves, Kranji, Sungei Buloh.

D. atropurpureum Miq. Flowers brownish red or yellow. Common, Tanglin, Kranji.

D. Leonis Rchb. f. A stout plant with triangular dull green flat leaves and fairly large yellowish flowers spotted red, scented of vanilla. On trees, common, Tanglin, Selitar. Bukit Timah.

D. prostratum Ridl. A smaller plant than the last, creeping on the trunks. Mangrove swamps. Kranji, Selitar, Sungei Blakang.

D. (Sect. *strongyle*). This section has slender stems with terete curved leaves.

D. teres Lindl. Stems a foot tall, flowers white, an orange spot on the lip. Pretty but rare, on high trees, Toas.

D. junceum Lindl. "Singapore Hort. Loddiges;" probably an error.

D. aciculare Lindl. "Singapore," probably an error.

D. subu'a'um Hook. fil. A small tufted plant. flowers white with pink veins. Bukit Timah, Bukit Mandai, Selitar.

D. acerosum Lindl. Common, Kranji.

D. flexile Ridl. Rare, Bukit Timah.

D. (Sect. *Virgata*) *conosta'ie* Rchb. f. Terrestrial, growing in water, with slender erect stems grassy leaves and small brown flowers. "Rumput Raja Sari." Changi, Bukit Mandai.

D. villosu'um Wall. Like the last but hairy. On leaves in dry woods, Bajau, Sungei Buloh, Kranji.

D. (Sect. *Bambusaefolia*) *gemel'um* Lindl. Epiphyte with long slender stems and pale yellow flowers. Common in mangrove swamps.

D. pensile Ridl. A very curious plant with long hanging stems, fleshy leaves and yellow flowers in pairs. Mangroves, Selitar.

D. (Sect. *clavata*) *tuberiferum* Hook. fil. Rare, Selitar, Toas.

D. crumenatum Sw. The "pigeon orchid." Very common all over Singapore.

D. (Sect. *distichophylla*) *bifarium* Lindl. A small plant with pale yellowish white flowers. Not rare, Tanglin, Toas, Selitar, Serangoon.

D. pandaneti Ridl. A curious plant with long creeping stems and grassy leaves, flowers fawn color and white. It always grows on Pandans, or Sagos, or Coconut palms, climbing up the stems. Bukit Mandai, Jurong.

D. (Sect. *breviflores*) *calibotrys* Ridl. * A pretty plant with bunches of white flowers with a red and yellow lip, sweet scented. Rare, Toas, Sungei Morai.

D. euphlebium Rchb. f. Mangrove swamps, Kranji, Selitar, Toas.

D. flavidu'u n Ridl. A tall slender plant with yellow or whitish flowers. Kranji, Jurong. Mangrove swamps.

D. (Sect. *Pedilonum,*) *pyropum* Ridl. A tall plant with bright orange flowers, fairly large. Very rare, Chua Chu Kang.

D. lamellatum Lindl. An odd plant with ovate flat thin stems and white flowers turning yellow. Damp woods, rare, Changi.

D. (Sect. *speciosa*) *Dalhousieanum* Wall. This well-known and grand plant has once been found on a big fallen tree in the forest at Chan Chu Kang.

Bulbophyllum macranthum Lindl. Flowers fairly large pink, spotted, scented of cloves. Common in woods.

B. patens King. Like the last but smaller. Chan Chu Kang.

B. rujosum Ridl.* Flowers yellow. Not common, Chan Chu Kang.

B. pileatum Lindl. Selitar.

B. striatellum Ridl.* Flowers very small, yellow. Not common, Chan Chu Kang.

B. catenarium Ridl. Abundant on mangrove trees. Sungei Buloh, Changi, Selitar.

B. auricella Ridl. On mangroves common, Kranji, Bajau.

B. clandestinum Lindl. Common on trees, Kranji, Tanglin, Sungei Morai, Selitar.

B. concinnum Hook. fil. Flowers small flame-colored. On mangroves abundant, Kranji, North Selitar.

B. vermiculare Hook. f. An inconspicuous little plant with greenish white flowers. Mangroves, Kranji, Selitar, Changi.

B. adenopetalum Lindl. "Singapore Hort. Loddiges;" is probably an error. It has never been found here again.

B. apodum Hook fil. Flowers small yellow in spikes, floriferous. Common, Kranji, Selitar.

B. botryphorum Rill. Forms large tufts on trees, flowers in small pendulous bunches, purple. Mangroves, Kranji, Toas, Sungei Buluh.

B. densiflorum Ridl.* A large long-leaved plant, flowers in bunches purple. Trunks of trees in woods. Selitar, Choa Chu Kang, Bukit Timah, Kranji.

B limbatum Lindl. "Singapore, Loddiges;" locality doubtful.

B. Trifolium Ridl.* A curious plant with pink flowers in a bunch like clover. Rare, Sungei Morai.

B. stella Ridl. Flowers on a long slender stem in a terminal raceme opening singly at intervals, large yellowish and pink on trees in thick jungle. Bukit Mandai, Jurong, Choa Chu Kang.

Cirrhopetalum Medusæ Lindl. Flowers in a dense mop-like head, with long tails to the sepals, white with pink spots. Stems and branches of trees in jungle often very high up, or on rocks. Tanglin, Galang, Bukit Timah, Chan Chu Kang, Pulau Ubin.

C. vaginatum Lindl. Flowers pale yellow. On trees, common.

C. concinnum Hook. fil. Flowers cream with pink spots or entirely pink. Common, Bajau, Kranji, etc.

C. gamosepalum Griff. Common, Bajau, etc.

C. acuminatum Ridl.* Rare, Choa Chu Kang.

C. microbulbon Ridl.* Rare, Sungei Buloh.

C. linearifolium Ridl.* Kranji, Bukit Mandai, Chua Chu Kang.

C. semibifidum Ridl.* Rare, Kranji.

C. makoyanum Rchb. f. Rare, Chan Chu Kang.

C. citrinum Ridl. Flowers yellow. Kranji, Tanjong Gol.

C. Blumei Lindl. Mangrove swamps, Kranji, Chan Chu Kang.

Eria obliqua Lindl. A small plant with little white flowers. Mangroves, Kranji.

E. floribunda Lindl. Flowers in dense spikes white with pink lips, pretty common. Mangroves, Kranji, Sungei Buloh, Sungei Morai.

E. tenuiflora Ridl. Flowers thin yellow. Sungei Morai, Toas.

E. bractescens Lindl. Trees, usually near the sea. Chan Chu Kang, Pulau Tekong, Pulau Selitar.

E. pudica Ridl. Rare, Changi.

E. endymion Ridl. Flowers white, sides of lip purple. Rare, Selitar.

E. nutans Lindl. Common, Selitar, Toas, Kranji.

E. neglecta Ridl. Common, Kranji, Selitar, Sungei Buluh.

E. longe-repens Ridl. Not common, Sungei Morai.

E. pulchella Lindl. Common on trees or rocks. Kranji, Pulau Tekong, Sungei Morai.

E. pannea Lindl. On trees. Common, Kranji, Chan Chu Kang.

E. stellata Lindl. Rare, Choa Chu Kang.

E. striolata Rchb. f. Rare, Kranji.

E. restita Lindl. Not uncommon, Kranji, Sungei Brih, Sungei Morai.

E. oligantha Hook. fil. Local, Toas.

E. velutina Lindl. Common, Sungei Morai, Kranji, Jurong.

Phreatia minutiflora Lindl. A very small plant with minute white flowers. Common in mangroves. Kranji, Toas, Jurong.

Agrostophyllum majus Hook. fil. Common, Kranji, Selitar.

Spathoglottis plicata Bl. A terrestrial orchid with pink flowers very common in open country and on damp rocks. Tanglin, Bukit Timah, etc.

Nephelaphyllum pulchrum Bl. Terrestrial. Damp woods, Bukit Timah, Bukit Mandai, Sungei Brih.

Plocoglottis porphyrophylla Ridl. Terrestrial, leaves purple. Local, Kranji, Toas, Selitar.

P. javanica Bl. Terrestrial, flowers red and yellow. Woods, local. Chan Chu Kang, Choa Chu Kang.

P. foetida Ridl. Wet woods. Bukit Timah.

Claderia viridiflora Hook. fil. A creeping plant climbing up trees. Flowers large green. Common, Garden jungle, Bajau, etc.

Coelogyne testacea Lindl. Sandy places near the coast on trees and stumps or on the ground. Kranji, Chan Chu Kang, Sungei Morai.

C. Rochussenii De Vr. Not common, Selitar.

C. Cumingii Lindl. Bukit Timah, on high trees.

C. Mayeriana Rchb. f. Flowers green and black, on palm trees near the sea. Very local, Sungei Buluh, Kranji, on high trees, Bukit Timah.

Calanthe curculigoides Lindl. A beautiful terrestrial plant, with apricot orange flowers with red lips, in a dense spike. Common, Choa Chu Kang, Kranji, Toa Payoh, Bukit Timah.

Dilochia Wallichii Lindl. Singapore (Wallich No. 1952), has never been found again in the peninsula.

Eulophia squalida Lindl. Terrestrial, flowers pink and green. Open grassy spots, common. Tanglin, Changi, Chan Chu Kang.

E. graminea Lindl. "Bawang hantu." Common in sandy spots. Tanglin, Choa Chu Kang, Chan Chu Kang.

Cymbidium aloifolium Sw. Epiphytic. Common on the island and Pulau Ubin.

var. *pubescens* less common, Sungei Buluh, Jurong.

Grammatophyllum speciosum Bl. Rare, Toas, Pulau Ubin.

Dipodium pictum Rchbf. Climbing on small trees, in woods. Common, Kranji, Chan Chu Kang.

Bromheadia palustris Lindl. Open grassy and sandy spots, very common. Flowers white lip pink and yellow. Sweet-scented.

B. sylvestris Ridl. In dense woods, local. Kranji, Changi, Toas, Sungei Morai.

B. a'ticola Ridl. On high trees, common, Bukit Timah, Bukit Panjang.

B. aporoides Rchb. f. On lofty trees. Bukit Timah, Selitar.

Polystachya singapurensis Ridl. *On trees near mangrove swamps, rare, Sungei Morai.

Adenoncos virens Bl. A small epiphyte with green flowers. Common on mangroves, Kranji.

Renanthera alba Ridl. Local, Pulau Selitar and other islands round the coast.

R. elongata Lindl. Rocks, Pulau Ubin; Roadside, Bukit Timah.

R. Maingayi Hook. fil. Pulau Selitar.

Renantherella histrionica Ridl. Rare. Mangroves, Serangoon.

Rhynchostylis gigantea Ridl. Very rare, one plant on a tree at Selitar.

Saccolabium perpusillum Hook. fil. A very small plant with minute white flowers. Common in mangroves, Kranji, Sungei Buluh.

Microsaccus javensis Bl. Mangroves, Kranji.

Taeniophyllum serrula Hook. f. A leafless epiphyte with long roots and small yellow and white flowers. Common, mangroves, orchard trees, etc. Tanglin, Toas, Kranji, etc.

Cleisostoma latifolium Lindl. Singapore, according to Lindley. Not seen.

C. spicatum Lindl. ? (*non aliorum*). A common plant in the Peninsula. I am doubtful as to its identification with Lindley's plant. Not common, Jurong.

Sarcanthus halophilus Ridl. On trees by the sea, common, Kranji, Sungei Morai, Sungei Tengeh, Pulau Tekong.

S. densiflorus Par. *S. castaneus* Ridl. Rare, on a tree, Dalvey road. This is figured by Dr. King, Ann. Bot. Gard. Calcutta Pl. 83 under the name of *Cleisostoma spicatum*, but it is not a *Cleisostoma* at all, as I understand the genus. Lindley's original description of *C. spicatum* is very short, but he says the flowers are pilose and the lip is longer than the spur, which does not apply to this plant.

Sarcochilus caligaris Ridl. On tree trunks in dense woods. Bukit Timah, Chan Chu Kang.

S. adnatus Ridl. Very rare, Toas.

Thrixperm u m li'acinum Rchb. fil. Scrambling among bushes and grass in swamps. Flowers lilac or white. Common, Selitar, Changi, Ang Mo Kio, Balestier plain.

Th. calceolus Rchb. f. Grows in great masses on the ground or on trees. Flowers white sweet fugacious. Common, Kranji, Sungei Morai, Bukit Timah Road, Pulau Ubin, Pulau Tekong.

T. cr ichnites Rchb. f. On trees, flowers yellow dotted red with very long tails to the sepals and petals. Rare, Selitar,

T. notabile Ridl.* Leaves dull red, flowers pink, on trees. Rare Chan Chu Kang, Bukit Mandai.

Dendrocolla maculata Ridl.* Rare, Bukit Mandai.

D. trichoglottis Ridl. Very common on orchards, and gardens. A small plant with fugacious yellowish flowers. Whole island.

D. filiformis Ridl. Leaves long slender terete, flowers white. On orchard trees, rare. Bukit Mandai, Chan Chu Kang, Dalvey road.

Aeriopsis javanica Reinwdt. Epiphyte with slender panicles of pink flowers. Trees, open country. Very common, Tanglin, Changi, Kranji, etc.

A. Ridleyi Hook. fil.* Flowers yellow, very rare, one plant only found at Bukit Mandai.

Podochilus microphyllus Lindl. A small creeping epiphyte with white flowers, on mossy trees, common. Chan Chu Kang, Ang Mo Kio, Kranji.

Appendicula bifaria Lindl. Common on trees, Sungei Morai, Kranji, Bukit Timah.

A. cæ'osa Bl. Very common, Bukit Timah, Sumbawang.

A. Lewisii Griff. Singapore (Wallich); not seen.

A. lucida Ridl. Mangrove swamps. Common, Kranji, Chan Chu Kang.

Thelasis elongata Bl. Common, mangroves, Kranji, etc.

Organthera elata Hook. f. Mangroves, common, Kranji, Sungei Buluh.

O. decurva Hook. fil. Common, mangroves, Serangoon, Selitar, Kranji.

Galeola. Curious saprophytes with long straggling yellow branches, no leaves, and white or yellow flowers, growing among long grass or over stumps or tree trunks, or even over native huts.

G. altissima Rchb. f. Not common, Chan Chu Kang.

G. hydra Rchb. f. Krangi, Sungei Buluh.

Vanilla Griffithii Rchb. f. Flowers white, fruit sweet, not vanilla scented. Local. Pulau Ubin.

Corymbis longiflora Hook. fil. A tall leafy plant about six feet tall with sweet white flowers. Damp woods. Pulau Ubin, Choa Chu Kang.

Vrydagzynea albida Bl. A small ground orchid, flowers white. Damp woods. Chan Chu Kang, Bukit Mandai, Choa Chu Kang.

V. lancifolia Ridl. Local, Bukit Timah.

V tristriata Ridl. * A very small plant, leaves reddish olive

with 3 pink stripes. Very wet spots in jungle, rare, Chan Chu Kang.

Macodes Petola Lindl. Leaves bright green with gold veins. Rare, Selitar.

Cystorchis variegata Bl. Leaves apple green with darker markings. Common in wet woods. Chan Chu Kang, Bukit Timah, etc.

var. *purpurea*. Leaves purple. Choa Chu Kang.

Hylophila mollis Lindl. Wet woods, common. Chan Chu Kang, Choa Chu Kang, Bukit Timah, Kranji.

Hetaria obliqua Bl. Rare, Bukit Timah.

Aphyllorchis pallida Bl. A leafless saprophyte, straw color. Not rare, Tanglin, Reservoir woods, Bukit Timah.

Anoectochilus geniculata Ridl. Leaves deep red with gold veins, Woods, Toas, Chan Chu Kang, etc.

Cryptostylis arachnites Bl. Rare, Bukit Timah, Pulau Damar.

Pogonia punctata Bl. Rare, Bukit Timah.

Didymoplexis pallens Griff. Leafless purplish saprophyte. Not common, Chan Chu Kang, Bajau.

Lecanorchis malaccensis Ridl. A black wiry leafless plant with pinkish flowers. Common in woods, Bukit Timah, Bajau, etc.

Gastrodia javanica Lindl. Rare, Chan Chu Kang, Bukit Mandai.

Habenaria singapurensis Ridl. * Very rare, Choa Chu Kang woods.

H. lacertifera Benth. Small white flowered ground orchid. Common along paths, in grass, etc. Whole island.

H. Maingayi King. * "Singapore Maingay." I have not seen this, and hardly see how it differs from the last, which is a somewhat variable plant.

APOTASIACEÆ.

Apostasia nuda R. Br. Shrubby plant with narrow leaves and small white flowers. Very common in dry woods, Bukit Timah, etc.

Neuwiedia Lindleyi Rolfe. A tall handsome plant with bright yellow flowers. Not rare, Bukit Timah, Chan Chu Kang, Chua Chu Kang.

N. Curtisii Rolfe. Rare, Changi, Kranji. This is the *Tupistra singapuriana* of Wallich's Catalogue.

N. Griffithii Rchb. f. Stems creeping, flowers white. Wet spots. Bukit Timah, Bukit Mandai, Sungei Morai, Chan Chu Kang, Jurong.

SCITAMINEÆ.

The Gingers have already been described in a previous number of the Journal.

Globba panicoides Miq. Woods, Bukit Timah, etc.

Gl. uliginosa Miq. Bukit Mandai.

Gl. leucantha Miq Bukit Timah, Chan Chu Kang.

Curcuma zeloaria Rosc. Abandoned gardens. Reservoir, Bukit Mandai, etc.

Costus speciosus Sm. Common, Jurong, Bukit Timah etc.
var. *argyrophyllus* Bukit Timah.

C. globosus Bl. Rocky places, Bukit Timah.

Zingiber zerumbet Sm. Waste ground.

Z. gracile Jack. Bukit Timah.

Z. puberula Ridl. Common, Bukit Timah, Serangoon, Bajau.

Z. Griffithii Bak. Bukit Timah.

Amomum hastilabium Ridl. Bukit Timah, Selitar.

Horsteldtia scyphus Retz. Common, Tanglin, Bukit Timah.

H. Leonurus Retz. Common. Tanglin, Bukit Timah, Bukit Panjang.

H. megalochilus Ridl. Rare, Bukit Mandai.

H. conica Ridl. Rare, Bukit Panjang.

H. Maingayi Ridl. Local, Bukit Timah, Sungei Buluh.

Plagiostachys lateralis Ridl. Local, Bukit Timah, Bukit Mandai, Reservoir woods.

Elettariopsis latiflora Ridl. Common, Bukit Timah, Kranji, Sungei Buluh.

Alpinia melanocarpa Ridl. Sandy spots near the sea. Kranji, Selitar.

A. Galanga L. Waste ground and gardens.

A. Rafflesiana Wall. Not common, Sungei Buluh, Changi, Toas.

Donax grandis Ridl. Bukit Timah, Bukit Panjang.

Phrynium Griffithii Bak. Common, Bukit Timah, Jurong.

(*Canna indica* L. and *C. Warcewiczii*. Garden escapes. Tanglin, etc.)

Ophiopogoneæ.

Peliosanthes violacea Wall. Dense woods, Bukit Timah.

P. viride Ridl. Common, Chan Chu Kang, Ang Mo Kio.

Amaryllideæ.

Curculigo recurvata Dryand. "Lumbah." Common in open country, Bukit Timah, etc.

C. latifolia Dryand. Very common and variable. All over the island.

C. villosa, Wall. *C. latifolia*, var. *villosa* Bak. This is a very distinct species from *C. latifolia*. The leaves are narrow lanceolate acuminate caudate stiff, glabrous above, cobwebby

beneath $2\frac{1}{2}$ feet long and 5 inches wide with a petiole one foot long. Spikes 2 inches long, bracts stiff oblong obtuse green, with the points recurved, something like the spike of a *curcuma*. Flowers ocre yellow $\frac{3}{4}$ inches across. Sepals lanceolate acute petals shorter and blunter. Fruit with beak one inch greenish white. Seeds few black about half as big as those of *C. latifolia* Dry. Not rare, in long grass and secondary growth. Bukit Timah, Tanglin, Chua Chu Kang.

Crinum asiaticum L. "Bakung." The common white sea shore *Crinum*. *C. pedunculatum* Br. is said to differ in the long-pedicelled flowers and elongate root stock. I have only seen one species in Singapore and Penang, and that has long pedicelled flowers and no root stock. The flowers open about 6 p. m. and are sweet scented, and very attractive to hawk moths. Sea coasts, Kranji, Selitar, Pulau Ubin.

Eurycles sylvestris Salisb. Is probably native here. It occurs in the sea sand at Changi, Bajau, etc., and is often cultivated.

TACCACEÆ.

Tacca cristata Jack. Common in woods, Bukit Timah, etc.

DIOSCOREACEÆ.

Dioscorea dæmona Roxb. "Gadung." A fairly large climber with prickly glaucous stems. The tubers sliced and washed in running water are eaten, but unless so washed are stated to be poisonous. Common in villages; I have never seen it elsewhere.

D. pyrifolia Kunth. Common, Bukit Timah, Chan Chu Kang, Bukit Mandai, Sungei Pandan.

D. oppositifolia L. Garden jungle, Selitar, Bukit Mandai Road.

D. laurifolia Wall. Woods and edges of jungles, common, Tanglin, Sungei Morai, Bukit Timah, Changi.

D. deflexa Hook. fil. "Singapore Maingay"; not seen.

D. polyclades Hook. fil. Not common. Sungei Pandan.

D. glabra Roxb. Tanglin, Bukit Mandai.

D. sativa L. "Ubi Kistala." Waste ground and hedges, common.

(*D. alata* L. The yam is often cultivated.)

ROXBURGHIACEÆ.

Stemona tuberosa Lour. Not common, Bukit Timah.

LILIACEÆ.

Smilax calophylla Wall. A dwarf erect shrub with yellow flowers and red berries. Common in dense jungle. Garden jungle, Changi, Bukit Mandai, Bukit Timah, etc.

S. myosotiflora A. De C. Slender climber flowers green. Rare, Garden jungle, Chan Chu Kang.

S. megacarpa Roxb. Not common, Garden jungle, Bukit Timah.

S. barbata Wall. A strong climber with bristly stems. Common all over Singapore, Tanglin, etc.

S. leucophylla Bl. with large lanceolate acuminate leaves broad at the base, smooth unarmed stem, and large flowers in solitary umbels on stout peduncles 2 inches long. Rare. Tanjong Katong (Hullett), Bukit Mandai, Bukit Timah.

Dianella ensifolia Red. "Lenjuang." Herb, flowers yellowish and fruit white, or flowers and fruits blue. Common all over Singapore.

Dracæna granulata Hook. fil. A tree about 20 feet tall with stems about 4 inches through, leaves narrow and dark green, flowers white in large panicles. A beautiful tree. In Journ. Bot. Apr. 1896. I confused this with *D. graminifolia* Wall, a low shrub occurring in the Dindings. Wet jungles, Bukit Timah, Bukit Mandai, Choa Chu Kang.

D. teruiflora Roxb. A low shrub. Common, thick jungles. Garden jungle, Selitar, Changi, Pulau Ubin.

D. Porteri Bak. Common in thick jungles. Garden jungle, Jurong, Chan Chu Kang, Pulau Ubin.

D. aurantiaca Wall. *D. Cantleyi* Bak. A shrub little or not branched, leaves green or purple with lighter rings. Flowers purple rarely white, fruit orange. Damp spots all over Singapore, common, Tanglin, Bukit Timah, Selitar, etc.

D. Maingayi Hook. fil. A big tree. Sandy spots near the sea. Changi, Sungei Morai, Bukit Panjang, Toas.

D. singapurensis Ridl.* Woods, Chan Chu Kang, Bukit Timah.

E. gracilis Wall. Common in jungles, Garden jungle, Chan Chu Kang, Bukit Mandai.

(*Cordyline terminalis*, the Dracæna of Gardens, is not wild anywhere in the peninsula, it is cultivated only.)

PONTEDERIACEÆ.

Monochoria hastæfolia Presl. Aquatic, flowers light blue. Common, Galang, Ang Mo Kio.

M. vaginalis Presl. Flowers dark blue. Common in ditches all over Singapore; the var. *plantaginea* is even commoner.

PHILYDRACEÆ

Philydrum lanuginosum Banks. Local. Wet sandy spots, Bedoh.

XYRIDEÆ.

Xyris anceps Lam. A tufted grassy plant with terminal cones of brown bracts, with fugacious yellow flowers. Sandy places, Balestier, plain Macpherson road, Changi, Pulau Tekong.

X. schœnoides Mart. Balestier plain, Reservoir.

COMMELINACEÆ.

Pollia sorzogonensis Endl. Herb, flowers white. Jungle, Pulau Ubin.

Commelina nudiflora L. "Rumput Aur." Common weed with blue flowers opening in the early morning and soon withering. Common all over Singapore.

C. benghalensis L. Weed in cultivated ground, flowers blue. Tanglin, Galang.

Aneilema nudiflorum Br. Small weed with pink flowers, waste ground, Tanglin.

A. vaginatum Br. Telok Kurau.

Forrestia mollis Hassk. "Setawa." A tall erect plant about, 4 feet high, with white flowers and pink capsules. Common in jungles, Bukit Timah, Tanglin, Tampenis, Reservoir, Pulau Ubin.

F. marginata Hassk. Stout creeping plant, flowers white. Capsule purple. Rocks, Bukit Timah.

Cyanotis cristata C. B. C. Sandy shores. Changi, Teluk Kurau.

Floscopa scandens Lour. Damp spots, Tanglin, Galang.

FLAGELLARIEÆ.

Flagellaria indica L. "Rotan Binni." Stems used for making baskets. Common in mangrove swamps and other places near the sea. Bajau, Changi, Pulau Ubin.
var. *minor* Jurong, Selitar, Bajau.

Susum anthelminticum Bl. Common in jungle. Bukit Timah, Chau Chu Kang.

PANDANEÆ.

Pandanus atrocarpus Griff. "Mengkuang." The biggest species here, often 40 feet high with very long leaves used for Kajangs, and ataps, baskets, hats, etc. Common all over Singapore, in swamps.

P. Houlletii Carr. About 15 feet tall, leaves large, dark red when young. Dense jungle, Bukit Timah.

P. fascicularis Lam. "Pandan Duri." A large much branched plant, with heads of fruit as large as a man's head, bright orange. Sea coasts, and often planted. The leaves used for mats and baskets. Common, Changi, Bajau, Blakang Mati, Pulau Ubin.

P. ornatus Kurz. A bush with narrow glaucous leaves. Bukit Timah.

P lævis Rumph. "Pandan Jelinkeh," with glaucous unarmed leaves, is often cultivated, the leaves used to flavour rice, and as a perfume.

P. parvus n. sp. *Pandanus* 15 Hook. Fl. Brit. Ind. Vol. vi. 487.

This has never been completely described nor named so I give a description of it here. Stem 3 feet tall or less, and $\frac{1}{2}$ inch in circumference erect grey, emitting long slender roots from all parts often producing shoots at the base seldom branched higher up. Leaves a foot long and 3 inches wide abruptly caudate acuminate, the point 2 inches long very slender dull green above glaucous beneath rather thin in texture, spines very small numerous on the edges and keel at the apex, none on the keel at the base of the leaf. Male spadix six inches long, rachis white. Bracts oblong boat-shaped keeled mucronate lowest 4 inches long, the mucro one inch long in the two lowest bracts which are empty, the upper bracts smaller with the keel, edges, and point green and armed with short stiff spiny bristles. Flowering bracts 7, softer than the lower ones ivory white spinulose ovate to ovate lanceolate, the terminal one flat lanceolate barely $\frac{1}{2}$ an inch long. Spikes 5 shorter than the bracts except the terminal one $\frac{3}{4}$ inch long. Stamens free very slender $\frac{1}{8}$ inch long. Female spadix solitary globose about $1\frac{1}{2}$ inch long carpels conic rather abruptly passing into a long brown shining upcurved spine nearly $\frac{1}{4}$ inch long.

Dry woods, common. Bukit Mandai, Bidadari, Changi, Kranji, Sungei Pandan, Pulau Ubin. Also occurs in Johore,

Perak, Sungei Ujong and Malacca. This is a very distinct little species, and one of the smallest known to me. The male plants are very rare. I have only met with one, and have never seen ripe fruit.

Three other Pandans occur here which I cannot at present identify.

P. near *P. helicopus* Kurz. but with very short styles to the fruit, leaves broad and very thorny at the tip. Woods, Bukit Timah.

P. sp. Stems slender about 5 feet tall much branched, leaves narrow fruit cylindric 3 inches long and one inch through. Carpels small narrowed into a single curved spine. Streams, Bukit Mandai, Bukit Timah.

P. sp. A tall plant about 10 feet high, with long glaucous leaves $1\frac{1}{2}$ inch broad, tips deflexed. Fruits about 5 in a spike subglobose on a stout peduncle, each 3 inches long, carpels acuminate into a long spine conic, orange color. Forming large thickets in swamps near Bukit Mandai on the road to Kranji.

Freycinetia angustifolia Bl. A slender climber with narrow leaves, often covering trees like a mat. Spathes apricot orange. common, Garden jungle, Bukit Timah, Kranji.

F. Gaudichaudi Benn. Leaves broader spathes yellow. Common, Bukit Mandai, Bukit Timah, Kranji.

F. insignis Bl? A very stout climber much bigger than the others. Thick woods. Garden jungle, Chan Chu Kang, Chua Chu Kang.

PALMÆ.

(*Areca Catechu* L. "Pinang." Betel-nut. Commonly cultivated, it does not seem to be known wild anywhere.)

Pinanga coronata Bl. Rare, Selitar.

P. disticha Bl. A dwarf palm with mottled leaves. Rather rare, Selitar.

P. Malaiana Scheff. A tall slender palm. Chan Chu Kang woods.

P. paradoxa Scheff.? Rare, Chan Chu Kang. The only specimen I have closely resembles this plant which is otherwise a native of our hills at 2,000 feet upwards.

P. polymorpha Becc. "Singapore Lobb;" doubtless an error for Penang.

Nenga Wendlandiana var. *Maluccensis*. "Pinang Umu." About 15 feet tall fruit black on a red spadix. Flowers cream colour. Wet woods common, Garden road, Chan Chu Kang.

Ptychoraphis singaporensis Becc. "Kerintin." A tufted palm about 10 feet tall. Abundant in dry woods, Garden jungle, Bukit Timah.

Cyrtostachys Lakka Becc. The sealing-wax palm. "Pinang Rajah." Wet places near the sea, common, Kranji, Toas, Chua Chu Kang.

Oncosperma horrida Scheff. "Bayas." A big thorny palm, common in dense jungle. Garden jungle, Bukit Timah.

O. tigillaria. Areca tigillaria Griff. "Nibong." Like the Bayas, but with drooping leaves, and smaller fruit. Quite distinct from the Javanese *O. filamentosa* Bl. which is made a synonym in Flor. Brit. Ind. The wood is used in building and for many other purposes. Common usually near the sea, Kranji, etc. The Malays distinguish several other species under the names of Lenou, Ibas, and Bayas Padi, but they do not seem to me to be specifically distinct.

Iguanura geonomæformis Becc. Not common. Streams in thick jungle, Bukit Timah, Bukit Mandai.

I. Malaccensis Becc. Rare, Chan Chu Kang.

I. Wallichiana Hook. fil. "Singapore Lobb"; evidently an error for Penang.

(*Arenga saccharifera* Labill. "Kabong," Sugar palm, is commonly cultivated.)

Caryota mitis Lour. "Tukus." Common in woods, Grange Road, Bukit Timah.

Orania macrocladus Mart. "Ebol." A noble palm about 40 feet tall. Rare in Singapore. Some trees at Chan Chu Kang. More abundant in Pulau Ubin.

Nipa fruticans Wurmb. "Nipah." Common in tidal mud, all round Singapore. I have found fruits of this in the swampy ground of the Botanic Gardens near Cluny road, showing that the Bukit Timah stream was formerly tidal and salt as far inland as this.

Phœnix sp. A few plants of a wild date occur scattered about round Singapore, at Toas and elsewhere, but I have never been able to get fruits or flowers.

Licuala ferruginea Becc. "Palas." A stem-less palm with orange colored flowers and pink fruits. Common in jungle, Garden jungle, Bukit Timah, Chan Chu Kang.

L. triphylla Griff. A very pretty dwarf species, local, thick woods, Changi.

L. spinosa Wurmb. Woods, Pulau Ubin.

L. acutifida Mart. "Singapore Lobb"; evidently an error for Penang.

Livistona Kingiana Becc. A tall palm about 40 feet or more with large fan shaped leaves. Dense woods, Choa Chu Kang, Toas, Kranji.

Calamus. The Rotans so extensively exported from Singapore belong to the genera *Calamus*, *Daemonorops*, *Korthalsia*, *Ceratolobus* and *Myrialepis*. They inhabit dense forests climbing to the tops of trees by the aid of their thorny flagella or whips. These flagella are used to protect fruit-trees from bats, the natives attaching them to the branches and bunches of fruits in such a way that the bats tear their wings when they fly to the tree.

C. javensis Bl. "Rotan Lilin." A fine slender rattan, Kranji, Bukit Timah.

C. diffusus Becc. "Singapore Lobb." I know nothing of this.

C. Singaporensis Becc. Forest near the Botanic Garden, Murton. A very imperfectly known plant. I do not know it, and can find nothing like it there now.

C. pallidulus Becc. Rare, Jalan Bray.

C. Oxleyanus Teysm. Rare, Toas.

C. insignis Griff. Bukit Timah.

C. densiflorus Becc. Bukit Mandai.

C. Lobbianus Becc. A short-stemmed species, with dark green leaves with white backs, and curious black fruits. Bukit Timah, Selitar.

C. n. sp. near *radulosus*. Garden jungle, Bukit Mandai.

Daemonorops grandis Mart. "Rotan Sumambu." Common, Garden jungle, Bukit Timah, Selitar.

D. hygrophilus Mart. "Rotan Sepat." Chua Chu Kang, Chan Chu Kang.

D. angustifolius Mart. Garden jungle, Changi, Selitar.

D. intermedius Mart. Garden jungle, Bukit Timah.

D. propinquus Becc. "Rotan Bakau." Kranji, Bukit Arang, Ang Mo Kio, Bukit Mandai.

D. didymophyllus Becc. Common, Bukit Timah, Changi, Toas, Selitar.

D. leptopus Mart. Bukit Timah, Selitar.

D. hystrix Mart. "Rotan Sabut." Very common, Garden jungle, Bukit Timah, Selitar.

D. geniculatus Mart. Bukit Timah, Toas.

genera. *Donax*, of which there are two species, is a tall stemmed plant much branched with ovate leaves, and slender panicles of white flowers, on zig-zag branches. *Phrynium*, is stemless, the leaves are usually large and long-stalked produced from the rhizome, the inflorescence, of simple or compound spikes, prole. duced directly from the root stock or from the side of the petiol There are six species.

Phrynium variegatum Hort, is an ornamental variety of the common arrowroot, *Maranta arundinacea* L. which has been cultivated in the Botanic Gardens Singapore for many years and was thence introduced into European Gardens, but its original home is lost.

Donax grandis Ridl. *Clinogyne grandis* Benth. Gen. Pl. iii. 651. *Maranta grandis*. Miq. Fl. Ind. Bat. Suppl. 616.

A very large plant growing 15 feet or more high with smooth green bare stems an inch through, and eight feet tall, branches clustered and jointed on a thickened portion of the stem, arranged spirally thickened at the base and spreading. Leaves ovate acute a foot long and six inches wide base rounded glabrous dark green, the large nerves distinct, petiole an inch long, sheaths six inches or more, no ligule. Racemes slender numerous hanging from the upper leaf axils, about a foot long, rachis slender zig-zag. Bracts narrow lanceolate acute. Flowers rather distant opening singly white shortly pedicelled. Sepals lanceolate acuminate $\frac{1}{8}$ inch long white pubescent. Corolla tube $\frac{1}{4}$ inch, lobes as long lanceolate acute. Lip yellow oblong obovate obtuse with a large ridge towards the base. Stamen petaloid oblong, cucullate one broad with a large curved side lobe, antheriferous one very narrow linear. Style short. Fruit globose white $\frac{1}{2}$ inch long. Seed single (rarely 2) light brown globose with a groove on one side.

In woods. Common in the peninsula from Tenasserim to Singapore. Singapore, Bukit Timah, etc. Johore, Sungei Ulu Sembrong. (Lake and Kelsall) Malacca, Bukit Sedanan, Panchur, Tampin, Sungei Udang. Negri Sembilan, Tampin, Berumban. Pahang, Tahan river. Selangor, Caves Kwala Lumpur. Perak, Thaiping Hills, Telok Sera, Dindings. Siam, Bangtaphan

(Dr. Keith). Borneo, Rejang (Dr Haviland). "Bemban" of the Malays. The stems are used for making baskets.

Donax arundastrum Lour. Flor. Cochinchinensis p. 15. *Clinogyne dichotoma* Salisb, Trans. Hort. Soc. i. 276. *Phrynium dichotomum* Roxb. As. Res. XI, 324. *Maranta dichotoma*, Wall. Cat. 6614. *M. ramosissima* Wall. 6615.

Stems numerous about 8 feet tall nearly an inch through, branches dichotomous terete thickened at the base deep dull green, sheaths at the joints lanceolate persistent. Leaves elliptic base rounded apex acute, petiole thick $\frac{1}{4}$ inch long, sheaths sub-terete no ligule. Panicle 2 to 8 inches long erect or nearly so, with few branches. Branches slender zig-zag. Bracts lanceolate involute green one inch long. Flowers white opening one at a time, two to a bract. Pedicels short with a small ochre-yellow conic gland some way below the ovary. Sepals spathulate the upper one the largest $1\frac{1}{2}$ inch long $\frac{1}{4}$ inch wide at the top free nearly to the base, the lower ones narrower and more acute joined to the corolla tube for half their length. Petals linear obtuse. Lip small spathulate apex rounded bilobed with a tongue-shaped process in the mouth and a line of hairs down the centre. Petaloid stamen $1\frac{1}{2}$ inch long bilobed lobes rounded $\frac{1}{2}$ an inch across. Antheriferous stamen adnate to lip with a slender filament and narrow anther. Cucullate stamen bilobed at the apex. Style stout stigma horse-shoe shaped. Fruit globose.

Common on river banks in thickets. It is called "Bemban Ayer." Johore, Kota Tinggie. Pahang, Pekan and a long way up the river. Kelantan, Kamposa. Selangor, Langat. Perak, Kinta river (King 831); Ipoh. It occurs also in India, Siam (Bangtaphan, Dr. Keith) and the Eastern islands. (Celebes, Dr. Koorders).

Loureiro's description might very well and even better apply to the last species, but he quotes Rumphius' picture (Herb. Amboinense Book 6, t. 7. which is evidently this species. His name *Arundastrum* is quoted in the Flora of British India as *Arundinastrum*. It is *Arundastrum* in the two editions I have here. The plant is much smaller than *D. grande* but has larger flowers.

gles. Garden Road, Kranji, Chua Chu Kang, Bukit Mandai, Bukit Timah.

Homalomena sagittæfolia Jungh. "Kelamoyiang." Dense swampy jungle, Selitar, Changi, Bukit Timah.

H. cœrulescens Jungh. Common in jungles, hedges and banks. Tanglin, Changi, Bukit Timah, Kranji, Selitar.

H. paludosa Hook. fil. Wet swampy woods. Common, Kranji, Bukit Timah, Toas, Ang Mo Kio, Jurong.

H. pumila Hook. fil. A small plant leaves deep velvety green or purple according to locality. Common in woods, and very variable. Bukit Timah, Selitar, Reservoir woods.

H. Griffithii Hook. fil. Common in thick jungle, Bukit Timah, Bukit Mandai, Tanjong Gol, Selitar.

H. Kingii Hook. fil. Singapore, swamps (King). Not seen.

H. ovata Hook. fil. Singapore (Wallich). Not seen.

H. singaporensis Regel. An altogether doubtful plant, cultivated in Russia.

Schismatoglottis Wallichii Hook. fil. Dense jungle in ravines abundant. Bukit Timah, Chan Chu Kang.

S. longipes Miq. Leaves ovate cordate dark green with a light green bar running round the centre. Abundant, rocky ravines. Bukit Timah.

Anadendrum montanum Schott. Climbing on trees low down. Common, Garden jungle, Bukit Timah.

A. medium Schott. *Pothos bifaria* Wall. *Pothos celaticaulis* of Gardens. The young plant grows flat on trees and rocks with close set distichous velvety green leaves and has long been cultivated under the last name in Europe. This form gradually passes into the adult which has stalked lobed and perforate leaves like those of *Monstera*. Not rare, Bukit Timah, Jurong, Bidadari, Reservoir woods.

Scindapsus pictus Hassk. A well known ornamental climber with green leaves mottled with silver. Common in woods

but rarely to be met with in flower. Bukit Timah, Chan Chu Kang.

Sc. hederacea Schott. Climber. Common thick woods, Bukit Timah, Sungei Buluh, Sungei Tengeh, Chua Chu Kang, Bidadari.

Raphidophora Lobbii Schott. Woods, Bukit Timah.

R. minor Hook, fil. Rare, Toas.

R. gracilipes Hook. f. ? Rare, Chan Chu Kang.

Epipremnum giganteum Schott. A strong creeper, with very large leathery leaves on trees and stumps common, Chan Chu Kang, Bedoh, Sungei Blukang.

Lasia heterophylla Schott. Tidal mud, also inland on muddy stream banks. Chua Chu Kang.

Cyrtosperma lasioides Griff. Common in marshes. Tanglin, Jurong, Chan Chu Kang, Bukit Mandai.

Pothos Curtisii Hook. f. Climbing on trees, Bukit Mandai, Kranji.

(*Acorus Calamus* L. "Deringu" cultivated and occuring as an escape. It rarely flowers here, but I found it in flower in June 1899.)

LEMNACEÆ.

Lemna paucicostata Hegelm. Ditches, Tanglin, Galang, etc.

L. polyrhiza. Ditches, Tanglin.

L. sp. near *L. trisulca* L. Galang.

Wolffia arhiza Wimm. Ditches, Alexandra road.

TRIURIDEÆ.

Sciaphila affinis Becc. A minute slender plant pink with violet fruits. Not rare, dense jungle among dead leaves. Bukit

Timah, Chan Chu Kang, Selitar. I doubt this being distinct from Blume's *Sc. tenella.*

NAIADACEÆ.

Naias minor All. Ditches, Gardens, often a perfect pest in the Gardens lake.

ERIOCAULONEÆ.

Eriocaulon serangulare L. Very common all over Singapore.

E. truncatum Ham. Damp sandy spots, common. Tanglin, Tampenis, Bukit Timah, Chan Chu Kang.

CYPERACEÆ.

Kyllinga cylindrica Nees. Rare, sandy spots. Cathedral close.

K. melanosperma Nees. Rare, in long damp grass. Tanglin.

K. brevifolia Rottb. Very common, whole island.

K. monocephala Rottb. Whole island.

Pycreus nitens Nees. Rare, damp sandy spots, Selitar, Changi.

P. polystachyus Beauv. Very common, waste ground and open spots. var. *laxiflorus.* Marshy ground.

Cyperus Haspan L. Very common in marshy spots. Whole island.

C. diffusus Vahl. Sandy woods, Bukit Timah.

C. radians Nees. Sea shores, Changi.

C. compressus L. Common in waste ground, whole island.

C. Iria L. Weed of cultivation, whole island.

C. distans L. Very common in waste ground.

C. Malaccensis Lam. Muddy spots by tidal rivers, Balestier plain.

C. pilosus Vahl. Wet or damp spots, whole island.

C. bancanus Miq. Cantley's collection, no locality.

C. Zollingeri Steud. Common, waste ground near villages.

C. rotundus L. Very common weed, gardens and waste ground

C. stoloniferus Retz. Sea sand, Tanjong Ru, Changi.

Mariscus Dregeanus Kth. Common sandy places near the sea. Tanjong Katong, Balestier plain, Changi.

M. Cyperinus Vahl. Very common in dry spots, all over Singapore.

M. Sieberianus Nees. Waste ground, Tanglin, Galang.

M. albescens Gaud. Common near the sea. Tanjong Ru, Rochore, Bajau.

M. microcephalus Presl. Galang.

Eleocharis variegata, var. *lariflora* C.B.C. Very common in ponds and marshes, Tanglin, Reservoir, Blakang Mati, Changi.

E. ochrostachys Steud. Not rare, Garden Lake, Changi, Selitar, Tivoli.

E. capitata Br. Local, Changi, Tampenis, Teban.

E. chaetaria Roem. Common in ditches, Tanglin, Chasserian Estate, Selitar.

E. fistulosa Schultes. Local. Marshes round the reservoir.

Fimbristylis tetragona Br. Balestier plain.

Fimbristylis acuminata Vahl. Common, Blakang Mati, Bukit Timah, Changi.

F. setacea Benth. Rare, Tanglin.

F. nutans Vahl. Damp sandy spots, Bukit Timah, Changi, Bukit Mandai, Blakang Mati.

F. pauciflora Br. Common all over Singapore in turf, and in damp spots.

F. diphylla Vahl. Very common all over Singapore.

Var. *pluristriata*. Long wet grass, Bukit Timah, Chan Chu Kang.

F. aestivalis Vahl. Damp cultivated ground, Tanglin.

F. ferruginea Vahl. Tidal river mud. Kranji, Chan Chu Kang, Pulau Ubin.

F. spathacea Roth. Sandy spots near the sea, common. Selitar, Bukit Mandai, Kranji, Changi.

F. tenera var. *obtusata*. Sandy spots and in turf, not rare, Tanglin, Jurong, Bukit Timah, Chua Chu Kang.

F. asperrima Boeck. Woods, Bukit Mandai.

F. nitiacea Vahl. Very common in dry spots all over Singapore.

F. globulosa Kth. Common. Tanglin.

F. complanata Link. Not very common. Botanic Gardens. Chan Chu Kang, Balestier plain.

F. leptoclada Benth. Common in sandy spots. Tanglin, Bukit Timah, Changi, Balestier plain.

Bulbostylis barbata Kunth. Common everywhere in sandy spots.

B. puberula Kth. In Cantley's collection, without locality.

Scirpus mucronatus L. Common in pools and ditches, Reservoir, Chan Chu Kang.

Sc. grossus Lin. fil. Rare. Ditch at Wayang Satu, Bukit Timah Road.

Fuirena umbellata Rottb. Common in swampy spots.

Lipocarpha argentea R. Br. Common in wet spots all over the island.

L. microcephala Kth. Local. Bukit Mandai, and on the Bukit Timah road near Kranji, Galang.

Rhynchospora Wallichiana Kth. Common in dry heathy spots. Jurong, Sungei Morai, Selitar.

R. malaica. C. B. C. Rare, Belok, Bukit Mandai.

R. aurea Vahl. Common in wet spots all over the island.

R. glauca var *chinensis.* Rare. Sandy spots usually near the sea. Blakang Mati, Changi.

Schoenus calostachyus Poir. Rare. Sandy spots, Changi.

Cladium glomeratum Br. Damp sandy spots, Changi.

Gahnia tristis Nees. Common, Blakang Mati, Bukit Timah, Sungei Morai, Tanglin.

Remirea maritima, Aubl. Sea shores, local, Changi, Tanah Merah.

Hypolytrum latifolium Rich. Woods, Jurong, Chan Chu Kang.

H. prolixum Boeck. Damp spots, Tanglin, Chan Chu Kang.

Thoracostachyum bancanum Kurz. Very common in all jungles.

Mapania palustris Benth. Dense woods, common, Bukit Timah, Chan Chu Kang.

M. longa C. B. C. In streams in jungle, rare, Chan Chu Kang.

M. multispicata C. B. C. Jungles, Bukit Timah.

M. humilis Naves Jungles, common, Chan Chu Kang, Bukit Timah, Kranji, Bajau.

Scirpodendron costatum Kurz. "Silensing." Common in tidal woods, forming large clumps of long grassy leaves, among which the flower panicles are concealed. The fruit is an inch long and is probably the largest in the order. Bukit Mandai, Jurong, Changi, Selitar.

Lepironia mucronata Rich. Swamps, Teban, Jurong.

Scleria radula Hance. Bukit Timah, Bedoh.

Scl. Ridleyi Clarke. Rare, Changi. It also occurs in Pulau Buru near the Carimon Isles and Hongkong.

Scl. biflora Roxb. Damp spots and turf. Blakang Mati, Bukit Timah, Changi, Tanglin.

Scl. zeylanica Poir. Wet spots, Changi, Tanglin.

Scl. caricina Benth. Very common, paths and turf, and damp spots. All over Singapore.

Scl. lateriflora Bckler. Kalang, Tanglin.

Scl. oryzoides Presl. Rare, wet spots, Changi.

Scl. bancana Miq. Common in open country, Tanglin, etc.

Scl. multifoliata Boeck. Not uncommon in woods. Bukit Timah, Garden jungle.

Scl. sumatrensis Retz. Very common in open country all over the island.

Scl. levis Retz. Common in dry open spots and waste ground. Whole island.

Carex cyrtostachys Brngn. Local, in a stream on Bukit Timah.

GRAMINEÆ.

Paspalum scrobiculatum L. Common everywhere.

P. conjugatum Berg. Very common, probably introduced.

P. distichum Burm. Plentiful in salt mud all round the island, Tanjong Ru, Bajau.

P. sanguinale Lam. Common everywhere in waste ground.

P. longiflorum Retz. Common in waste ground.

Isachne Kunthiana Wt. Wet places in woods. Bukit Mandai, Chan Chu Kang, Jurong.

I. australis R. Br. Very common in marshes, Tanglin, etc.

I. miliacea Roth. Wet spots in woods, Tanglin, Bukit Timah Road 6th mile, Selitar.

Panicum crusgalli L. Rare, collected by Hullett without locality

P. colonum L. Common in waste ground.

P. distachyum L. Not Common, Bukit Mandai, Changi, Tanglin.

P. repens L. Common, Tanglin, Reservoir, Changi.

P. auritum Presl. Wet, open spots, Reservoir, Changi, Ang Mo Kio.

P. indicum L. Common, waste ground.

P. myosuroides Br. Ditches, Ang Mo Kio, Kranji.

P. nodosum Kth. Hedges and thickets, Tanglin, Chan Chu Kang.

P. ovalifolium Poir. Rare, Government Hill.

P. sarmentosum Roxb. Woods, Grange Road, Changi, Sumbawang.

P. luzonense Presl. Dry roadsides and waste ground, Tanglin, Galang.

P. patens L. Shady spots, Tanglin, Bukit Timah, Chua Chu Kang.

P. pilipes Nees. Roadsides, Bukit Timah, Gardens, etc.

P. latifolium L. Damp, shady spots, Tanglin.

Axonopus cimicinus Beauv. Waste ground, Tanglin, Chan Chu Kang.

Setaria glauca Beauv. Waste ground, common. Tanglin, Ang Mo Kio, Chan Chu Kang.

Thuarea sarmentosa Pers. Sandy places near the sea, local. Changi, Galang, Teluk Kurau.

Leersia hexandra Sw. Common in marshes, whole island.

Leptaspis urceolata R. Br. Dense woods, Bukit Timah, Changi, Chan Chu Kang.

Perotis latifolia Ait. Sandy places, Cathedral compound, Galang, Changi.

Zoysia pungens Willd. Common in turf and near the sea.

Coix Lachryma-Jobi L. "Job's Tears," "Jilei." Occurs in waste ground.)

Limeia ornithopoda Trin. Dry sandy spots, Tanglin, Bukit Timah road. Var. *Subramosa* sub. var. *imperfecta* Hackel. Changi.

Imperata arundinacea Cyrill. "Lalang." Probably the commonest plant in the island.

I. exaltata Brngn. "Lalang Jawa." Common, usually near abandoned villages, Selitar, Bajau, Chua Chu Kang.

Ischoemum rugosum Salisb. Rare, Galang.

I. magnum Rendle. Blakang Mati, Balestier plain, Galang. I have also collected it in Labuan.

I. muticum L. Common everywhere.

I. ciliare Retz. Roadsides, and turf. Very common.

I. timorense Kth. Roadsides, Tanglin, Kranji.

Rottboellia glandulosa Trin. Borders of woods and thickets, Changi, Bajau, Pulau Ubin.

Andropogon pseudogrraya Kth. Sandy places. Galang, Changi, Blakang Mati.

A. aciculatus Retz. Very common in turf, etc., everywhere.

A. contortus L. Sandy spots near the sea, Changi.

Anthistiria arguens Willd. Dry open spots. Chinese cemetery, Sepoy lines.

A. gigantea var. *villosa*. A very tall reedlike-grass. Dry spots. Fort Siloso, Siglap, Balestier plain.

Polytrias præmorsa Hack. Grassy spots. Tanglin, Chasseriau Estate.

Sphoerocaryum elegans Nees. Wet paths in jungle common, Kranji, Ang Mo Kio.

Sporobolus indicus L. Mt. Faber, Ang Mo Kio, Tanglin, Galang.

Eriachne pallescens Br. Dry sandy spots. Blakang Mati, Galang.

Cynodon dactylon Pers. Common in dry spots.

Chloris barbata Sw. Pulau Brani (introduced) Passir Panjang

Eleusine indica L. Very common in waste ground. The cultivated variety *coracana* is also sometimes to be met with.

E. aegyptiaca Desv. Local, Rochore, Changi.

Eragrostis tenella R. and S. Very common in waste ground.

E. amabilis Wight. Very common.

E. elegantula Steud. Chasseriau Estate.

E. elongata Jacq. Dry spots, Tanglin, Changi, Bukit Timah, Chasseriau Estate.

Centotheca lappacea Beauv. Common in woods. Garden jungle, Bukit Timah, etc.

Lophatherum Lehmanni Brngn. Woods. Garden jungle, Selitar, etc.

Bambusa Ridleyi Gamble.* A very slender bamboo growing in dense woods, Bukit Timah.

(*Dendrocalamus flagellifer* Munro. Cultivated for its edible shoots. Jurong, Tanglin.)

Schizostachyum Blumei Nees Perhaps introduced from Java, Roadsides, Selitar, Bukit Timah Road.

(*Gigantochloa verticillata* Munro. Cultivated, Tanglin, Bukit Timah Road.)

Ochlandra Ridleyi Gamble.* "Buluh Kasap." Bukit Mandai, Choa Chu Kang. The Javanese say this is introduced from Java, but it is not known elsewhere than Singapore.

FILICES.

In this list of the ferns, I have followed Beddome's Ferns of British India.

Gleichenia linearis Burm. *Gl. dichotoma* Willd. "Resam," common all over Singapore.

Alsophila latebrosa Hook. Tree fern, stem about 5 feet tall and 2 inches through. Common in damp woods. Bukit Timah, Jurong, Chan Chu Kang, Bukit Mandai, Choa Chu Kang.

A. comosa Hook. Not rare, Bukit Timah, Jurong, Selitar, Chan Chu Kang.

A. Ridleyi Bak. Rare, Sungei Morai.

Lecanopteris carnosa Bl. Very rare, on lofty trees, Bukit Timah,

Hymenophyllum polyanthos. Common on trees and rocks in thick woods. Bukit Timah, Kranji, Changi, Bajau, Sungei Morai.

H. denticulatum Sw. Not common, mangroves, Kranji.

H. Neesii Hook. Selitar, Bukit Timah.

H. sp. Bukit Mandai (8938).

Trichomanes muscoides Sw. Rocks, Bukit Timah.

Tr. Javanicum Bl. Terrestrial, very common in all damp woods.

Tr. rigidum Sw. Less common, Bukit Timah, Toas, Kranji, Sungei Morai, Selitar, Tanjong Merawan.

Tr. filicula Bory. *Tr. bipunctatum* Poir. Creeping on rocks and trees, not very common, Bukit Timah, Chan Chu Kang, Kranji.

Tr. maximum Bl. Rare, Bajau.

Tr. digitatum Sw. Rare, Kranji.

Tr. parviflorum Poir. "Singapore, Moore's Herbarium" file Beddome; not seen.

Humata heterophylla Sw. On trees and on the ground in sandy spots. Common, Changi, Bajau, Tampenis, Kranji, Bukit Timah.

H. angustata Wall. On trees, Sungei Morai, Chan Chu Kang.

H. pedata Sw. Not common, Kranji, Bajau.

H. parallela Wall. Tanjong Merawan.

H. sessilifo ia Bl. "Singapore, Sinclair and Moore's Herbarium" in Beddome; not seen.

Leucostegia parru'a Wall. Mangrove swamps. Kranji, Sungei Buluh, Tanjong Merawan.

Prosaptia contigua Sw. "Singapore" fide Beddome, must be very doubiful.

Davallia triphylla Hook. On lofty trees, apparently by no means rare, but difficult to produce. Bukit Timah, Selitar, Kranji.

D. solida Sw. Common, Selitar, Chua Chu Kang, Sungei Morai.

D. elegans Sw. On trees, often very high, and on the sand of the shores, Bukit Timah, Changi.

Microlepia speluncae L. Common on banks, Tanglin, Ang Mo Kio, Changi, Pasir Panjang, Rochore.

Lindsays repens Thw. Climbing on small trees in thick forest. Bukit Timah.

L. trapeziformis Dry. *L. Lancea* (L). Dense forest, Bukit Timah Selitar.

L. borneensis Hook. Jurong.

L. rigida Sm. Rare, Sungei Buluh.

L. Walkerae Hook. In open wet spots, common, but local, Changi, Tampenis, Bukit Mandai.

L. divergens Wall. Co mmon in dry woo ls, Bukit Timah, Bajau, Sungei Morai.

L. linuginosa Wall. On trees, Jurong river, Bajau, on trees in the Botanic Gardens.

Schizoloma lobata Poir. In dense woods, Bukit Timah.

Sch. ensifolia Sw. In thick wet woods. Chua Chu Kang.

Sch. media R. Br. Rare, Pulau Brani.

Sch. heterophylla Dry. Rare, Pulau Brani.

Adiantum flabellulatum L. Banks, Changi; Rocks, Pulau Ubin.

A few other species have established themselves as garden escapes.

Cheilanthes tenuifolia Sw. Common in dry spots, Tanglin, Chan Chu Kang, Pulau Ubin.

Pteris ensiformis Burm. Common in dry spots, Bukit Timah, Tanglin, Pulau Ubin.

Pt. longifolia L Mount Pleasant, (Hullett).

Pt. aquilina L Common all over Singapore.

Litobrochia incisa Thunb. Tanglin (probably an escape).

Ceratopteris thalictroides L. Common in ditches and sluggish streams. Tanglin, Selitar, Changi.

Blechnum orientale L. Very common in open places, Tanglin, Bukit Timah, etc.

B. Finlaysonianum Wall. In similar localities, Reservoir, Bukit Timah, Chan Chu Kang.

B. serrulatum Rich. Singapore (Hullett).

Thamnopteris nidus L. Common on trees all over Singapore, the large form var. *musaefolia* is the commonest form.

Asplenium squamulatum Bl. Much resembles the last, but has a creeping stem. Wet woods, usually growing on stumps, Bukit Timah, Chua Chu Kang.

A. longissimum Bl. On roots of Bamboos, Tanglin.

A. tenerum Forst. Woods, common, Garden jungle, Bukit Timah, Ang Mo Kio.

A. falcatum Lam. Rare, woods, Bukit Timah.

A. macrophyllum Sw. Not common, Chan Chu Kang, Sungei Buluh, Pulau Ubin (Kunstler).

Diplazium pallidum Bl. Toas.

D. porrectum Wall. Common in woods, Reservoir, Holland Road, Chan Chu Kang, Bukit Timah, Changi.

D. bantamense Bl. Singapore (Hullett).

D. sylraticum Presl. Singapore (Hullett).

D. speciosum Mett. Wood near Holland road, Serangoon Road, Bukit Timah.

D. tomentosum Hook. Woods, Bukit Timah.

D. sorzogonense Presl. Bukit Timah.

Anisogonium cordifolium Mett. Rocks, Bukit Timah.

Aspidium Singaporianum Wall. Woods, common, Bukit Timah, Chua Chu Kang.

A. vastum Bl. Woods, Bukit Timah, Pulau Ubin.

A. cicutarium Sw. Common in woods, Sungei Blukang, Bukit Timah, Pulau Ubin.

A. semibipinnatum. Bukit Timah, Bajau, Bukit Mandai.

A. Zollingerianum Kze. Bukit Timah.

Pleocnemia gigantea Bl. Bukit Timah.

Lastrea crassifolia Bl. Bukit Timah, Bajau, Bukit Mandai

L. fuscipes Wall. Bukit Timah.

L. appendiculata. Chua Chu Kang.

Nephrodium unitum L. Common in open places, Galang, Selitar.

N. cucullatum Bl. Common, Sepoy lines, Jurong, Changi.

N. aridum Don. Jurong, Green Hill, Kranji.

N. urophyllum Wall. Dense jungle, Bukit Timah.

N. molle Desv. Common in open places, Tanglin, Chua Chu Kang, Selitar, Pulau Brani.

Var. *amboinense*. Green Hill, etc.

Var. *procurrens*. Green Hill.

Var. *didymosorum*. Not rare.

N. pennigerum Bl. Chan Chu Kang.

N. tectum Wall. Singapore (Wallich); not seen.

N. heterocarpon Bl. Green Hill (Hullett).

N. polycarpum Bl. *Mesochlæna polycarpa* Bl. Woods, Bukit Timah.

N. lutebrosum Kze. Bukit Timah.

N. truncatum Presl. Singapore (Hullett).

Nephrolepis exaltata L. Common in open country all over Singapore.

N. volubilis J. Sm. Climbing over bushes, Rochore, Toas, Sungei Morai.

N. acuta Presl. Singapore (Hullett.)

N. Duffii. Has established itself at Changi and a few other places.

Dictyopteris Barberi Hook. Bukit Timah.

D. difformis Bl. Bukit Timah.

Polypodium decorum Brack. Common on trees, mangrove swamps, Kranji, Sungei Buluh, Toas.

P. streptophyllum Bak. Very rare. Trees on Serangoon Road (Murton).

P. adspersum Bl. and *P. setigerum* Bl. in Moore's Herbarium (Beddome), probably wrongly localised.

Goniophlebium verrucosum Wall. Damp open spots, Bukit Mandai, Pasir Panjang.

Niphobolus adnascens Sw. On trees, Changi, Pulau Ubin.

N. acrostichoides Sw. Garden jungle, Chan Chu Kang.

N. penangianus Hook. Rare, Kranji.

Dipteris Horsfieldii Br. Abundant on rocks and banks overhanging the sea, all round the island from Pasir Panjang to Changi, also on Pulau Tekong and other islands in the Strait.

Drynaria Linnaei Bory. On trees, Changi, Serangoon, Toas.

D. quercifolium L. On trees, Toas.

D. splendens Hook. Singapore (Beddome).

Pleopeltis stenophylla Bl. On lofty trees, Bukit Timah.

P. sinuosa Wall. Common on trees. This curious fern is remarkable for its hollow rhizome always full of ant's nests. Gardens, Jurong, Bukit Timah.

P. longifolia Mett. Sungei Morai.

P. angustata Sw. Common on trees, Gardens, Sungei Morai, Changi, Bajau, Serangoon.

P. punctata L. *P. irioides* Hook. Common on trees and banks. Tanglin, Siglap, Sungei Buloh, Chan Chu Kang.

P. phymatodes L. Very common on trees on the ground in dry spots. Tanglin, Bukit Timah, Selitar, Changi.

P. nigrescens Bl. Woods, Bukit Timah.

Monogramme trichoidea Sm. A very small hair-like fern, rocks, Bukit Timah.

Syngramme Wallichii Hook. Woods, common, Bukit Timah, Selitar, Chua Chu Kang, etc.

S. alismaefolia Hook. Less common, Bukit Timah, Chan Chu Kang.

Selaginea Feei Hook. Common on trees, especially mangroves Kranji, Bajau, etc.

S. membranacea Hook. "Singapore, Moore's Herb." (Beddome.)

Gymnogramme calomelanos. The silver fern occurs here and there as an escape. Tanglin, Chan Chu Kang.

Meniscium triphyllum Sw. Banks of streams, Toa Payoh.

M. cuspidatum Bl. Upper Mandai, Bukit Timah, Chua Chu Kang.

Antrophyum reticulatum Kaulf. On trees and rocks, not common, Bukit Timah.

A. plantagineum Kaulf. Selitar.

Vittaria elongata Sw. Very common on trees, Gardens. Kranji, Thompson Road, etc.

V. scolopendrina Presl. On trees. Chua Chu Kang.

Taenites blechnoides Willd. Very common in woods all over Singapore.

Drymoglossum piloselloides Presl. Common on trees everywhere.

Elaphoglossum latifolium Sw. On trees in mangrove swamps. Kranji.

Stenochlæna palustre L. Common, climbing over trees and bushes. The young creeping form with delicate finely cuts fronds may be found in wet woods. I found a curious fasciated form on Bukit Timah. Rochore, Tanglin, Bukit Timah, etc.

Polybotrya appendiculata Willd. Local. Rocks, Bukit Timah.

Gymnopteris subrepanda Hook. Bukit Timah.

G. Presliana Hook. Bukit Timah (Hullet).

Acrostichum aureum L. Common in tidal mud, on all the rivers.

Platycerium grande Sm. Not seen. Singapore (Beddome).

Pl. biforme Bl. Common in trees all over Singapore.

Schizaea dichotoma Sw. Dry woods, common all over Singapore.

Sch. digitatum Sw. Dry woods. Common all over Singapore.

Lygodium microphyllum R. Br. Common in open places, thickets, etc. Tanglin, Changi, Kranji.

L. circinatum Sw. *L. dichotomum* Bedd. "Ribu-Ribu." Very abundant, climbing over trees and bushes, whole island.

L. flexuosum L. Singapore, Hullett.

Angiopteris evecta Hoffm. Rocky woods, Bukit Timah.

Ophioglossum nudicaule L. Bukit Panjang, Chan Chu Kang.

O. pendulum L. Epiphytic on *Thamnopteris* and *Platycerium*. Not common, Tanglin.

LYCOPODIACEAE.

Lycopodium cernuum L. Terrestrial. Common all over Singapore, in open country and secondary growth.

L. taxifolium Sw. Epiphytic on mangroves and other trees near the sea. Sungei Sumbawang, Chan Chu Kang.

L. phlegmaria L. Epiphytic, Garden jungle, Chan Chu Kang.

L. squarrosum Forst. Epiphytic. Tanjong Merawan.

L. nummulariifolium Bl. Epiphytic, Chan Chu Kang.

Selaginella atroviridis Spring. Common in woods, Garden jungle, Changi, Bukit Timah, Chua Chu Kang.

S. plumosa Bak. Plentiful in many spots in damp woods, Bukit Timah, Jurong.

S. Willdenowii Bak. Common climbing in thickets Bukit Timah, Bukit Mandai, Kranji, etc.

S. trichobasis Bak. "Singapore, Sir W. Norris," fide Baker; perhaps an error for Penang, where Sir W. Norris collected plants. I have not seen it in Singapore.

S. sp. Small plant, Bukit Timah, No. 6547.

Psilotum flaccidum Wall. On trees in mangrove swamps, Kranji

P complanatum Sw. Mangroves, Sungei Morai, Kranji.

RHIZOCARPEAE.

Azolla pinnata R. Br. A small floating plant. Ditches, common, Tanglin, Ang Mo Kio, Galang.

Addenda.

Ludwigia parviflora Roxb. Ditches, Tanglin.

Enhydrias angustipetala Ridl. Common in ponds and ditches, Tanglin. This new genus must be put in place of *Hydrilla verticillata*, for which it was mistaken.

Chinese Names of Streets in Penang,

By LO MAN YUK.

Communicated by the Secretary.

In making this little compilation, the compiler has followed the example set before him by the late Mr. H. T. Haughton who published a list of street names of Singapore Town with their Chinese equivalents in the Journal of the Straits Branch of the Royal Asiatic Society in the June issue of 1891. The present compilation may be taken as a fairly complete list of the names of roads, streets and lanes in George Town with their respective Chinese names as called by the Hokkiens and Cantonese, two of the more important sections of the Chinese community in Penang, as well as with notes explaining the meaning and giving the derivation of the Chinese names. From a glance at these explanatory notes, it will be observed that the Chinese call their streets generally after some prominent buildings or objects of view, or the nationality of the people residing, or the particular kind of business carried on, in the locality. There are, however, some new and out-of-the-way places which have no Chinese names but which are inserted here partly for the purpose of making the list as complete as possible and partly for the purpose of leaving space for the insertion of any Chinese names that may be evolved in future. To this little compilation are appended (1) a list of some notable buildings and places in George Town (2) a list of some district names in town and up-country, (3) a list of the names of some islets in the vicinity of Penang and (4) a list of names of some places in Province Wellesley and Pindings; all with their Chinese equivalents. In conclusion, the compiler desires to express his best thanks to Mr. Cheam Cheow Heng, the Senior Chinese Interpreter of the Police Courts, and other friends for much valuable information concerning this compilation.

Acheen Street: (1) *Hokkien.* Koâi" laû-á 高樓仔 "a small high tower," the high tower is the four-storied corner house at the junction of Acheen Street and Beach Street. *Cantonese*, Ko lau chai 高樓仔 (2) *Hokkien*, Phah chióh ke 打石街 "striking stone street;" so called from the stone-cutters' shop there. *Cantonese*, Ta shek kai. 打石街

Acheen Street Ghaut: (1) *Hokkien*, Koâi^{n}-laû-á lō͘-thaû 高樓仔路頭 *Cantonese*, Ko-lau-chai lo-thau 高樓仔路頭 (2) *Hokkien*, Phah-chióh-ke lō͘-thaû 打石街路頭 lō͘-thaû means landing-place. *Cantonese*, Ta-shek-kai lo-thau. 打石街路頭

Ah Quee Street: *Hokkien*, A kùi ke 亞貴街 called after Captain Ah Quee who presented it to the Municipality. *Cantonese*, A Kwai kai 亞貴街

Argus Lane: *Hokkien*, Sek lân ni (Serani) lé-pài-tn̂g aū hāng-á 色蘭乳禮拜堂後巷仔 "Serani Church back lane" = the lane behind the Church of Assumption.

Argyle Road: *Hokkien*, Bang-ka-lí hāng 望葛里巷 "Bengali lane;" so called because there used to be many, and there are still some, Bengalis living there. *Cantonese*, Mang-ka-li hong 孟加里巷

Armenian Street: PART I., between Beach Street and Pitt Street. (1) *Hokkien*, Pún-thaû-kong hāng 本頭公巷 "gods' lane;" so called after the Kong-si house

of the Toā Peh Kong 大伯公 otherwise known as the Kièn Tek 建德 secret society, where they kept their gods; the remains of that Kong-si house may still be seen at the junction of Armenian Street and Pitt Street. *Cantonese*, Tai-pak-kung hong 大伯公巷 "gods' lane." (2) *Hokkien*, Kièn goân ke 建元街; Kièn is evidently taken from the name of the Kien Tek Kong-si referred to in (1). Goân means origin, and Ke street.

PART II., between Pitt Street and Acheen Street: *Hokkien*, Phah tâng ke 打銅街 "striking copper street," from the Malay braziers' shops there. *Cantonese*, Ta thung kai 打銅街

Armenian Street Ghaut: *Hokkien*, Pún-thaû-kong-hāng lō·-thâu 本頭公巷路頭 *Cantonese*, Tai-pak-kung-hong lo-thau. 大伯公巷路頭

Ayer Itam Road: *Hokkien*, A-iá i-tâm (Ayer Itam) lō· 亞也依淡路; lō· means road. *Cantonese*, Ayer Itam lo 亞逸依淡路

Bagan Jermal Road: *Hokkien*, Oân-tó·-lō· 灣斗路 Oân-tó· means the bay.

Barrack Road: *Hokkien*, Peng fâng lō· 兵房路 "soldier barrack road." *Cantonese*, Peng fong lo 兵房路

Beach Street: PART I., between Light Street and China Street. *Hokkien*, Thó·-khò· (thaú-khò·) ke 土庫街

"godown street;" street where the European firms are. *Cantonese*, Tho-fu kai 土庫街

PART II., between China Street and Chulia Street. *Hokkien*, Kang-á-khaú 港仔口 "harbour entrance"; in olden times, before the reclamation of the ghauts, the shipping business was principally done in this part of Beach Street by the Chinese. *Cantonese*, Kong chai hau 港仔口

PART III., between Chulia Street and Armenian Street. *Hokkien*, Tiong ke 中街 "middle street," i. e., the middle part of Beach Street. *Cantonese*, Chung Kai 中街

PART IV., between Armenian Street and Acheen Street. *Hokkien*, Toan lô·-sin 緞羅申. *Cantonese*, Tuan lo-san 緞羅申 Lô-sin is Hussain, i.e., Tungku Syed Hussain, who formerly owned most of the houses in this part of Beach Street.

PART V., between Acheen Street and Malay Street. *Hokkien*, Phah thih ke 打鐵街 "striking iron street," from the blacksmiths' shops there. *Cantonese*. Ta thit ka 打鐵街.

PART VI. between Malay Street and Prangin Ditch. *Hokkien* Siā bóe 社尾 "village end"; formerly this was practically the end of the town. *Cantonese*, She mi 社尾 Those parts of Prangin Road and Bridge Street which join Beach Street at the Anson Bridge are sometimes, though improperly, called Siā-bóe; the general name for the whole district round about here is Ujong Pasar, meaning end of town.

PARTS IV, V. and VI. are often called Fuk Kin kai 福建街 "Hokkien Street" by the *Cantonese*, because most of the shopkeepers there are *Hokkiens*.

Bishop Street: PART I.. between Beach Street and Penang Street. (1) *Hokkien*, Chhat bok ke 漆木街 "painting wood street," from the furniture makers' shops there. *Cantonese*, Chhat muk kai (2) *Hokkien*, Chhâ kang ke 漆木街 "wood workmen street."

PART II., between Penang Street and King Street. *Hokkien*, Lū-sòng lé-pài-tn̂g chêng 呂宋禮拜堂前 "Armenian Church front," Lū-sòng being a corruption of Luzon of the Philippine Islands. *Cantonese*, Lu-sung lai-pai-thong Chhin 呂宋禮拜堂前

PART III., between King Street and Pitt Street. *Hokkien*, Sūn-tek Kong-si ke 順德公司街 called after the Kong-si house of the Sūn Tek people. *Cantonese*, Shun Tak Kong-si kai 順德公司街

Brick-Kiln Road: *Hokkien*, Hong chhia lō· 風車路 "wind carriage road"; "wind carriage" is the Switchback Railway. *Cantonese*, Fung Chhe lo 風車路

Bridge Street: PART I., Beach Street end. *Hokkien*, Kòe káng-á 過港仔 "passed rivulet," the other side of the Prangin Ditch. *Cantonese*, Kwo kong chai 過港仔

PART II., the mildle part. *Hokkien*, Pang lông 廊枋 "plank depot." *Cantonese*, Pan Chhong 廊枋

PART III. Jelutong Road end., *Hokkien*, Sêng-hông biō lō. 城隍廟路 "Seng Ong Temple Street," called after the

Temple of the tutelary God of the town. *Cantonese*, Shing Wong miu lo 城隍廟路

Buckingham Street : *Hokkien*, Sin-ke thaû 新街頭 "Campbell Street head." *Cantonese*, San-ke thaû 新街頭

Burmah Road: *Hokkien*, Gû chhia chúi 牛車水 (often contracted to Chhia chúi, "bullock-cart water"; before the construction of the Municipal Water Service, water sellers used to come to a well here for water and convey the same in bullock carts to town for sale. *Cantonese*, Ngau Chhe Shui 牛車水

Campbell Street: (1) *Hokkien*, Sinke 新街 "new street," in contradistinction to Chulia Street, the old street where all the Chinese brothels were before Campbell Street was constructed. *Cantonese*, San kai 新街 (2) *Hokkien*, Sin tōa-mûiⁿ-laû 新大門樓 "new Chulia Street" (see Chulia Street). *Cantonese*, San tai mun lau 新大門樓 (3) *Cantonese*, Kam-le tai kai 金利大街 Kam-le being the Cantonese pronunciation of Campbell, and tai kai meaning big street. This last name is chiefly used in matters of marriage, funeral and joss processions.

Cannon Square: *Hokkien*, Liông San Tông lai 龍山堂內 "Liong San Tong inside"; Liông San Tông is the Chop of the Seh Khu Kong-si 姓邱公司 which is inside this square. *Cantonese*, Shing Yau Kung-si; the Kong-si house of the surname Yau clan.

Cannon Street: *Hokkien*, Toā Chhèng Khang 大銃空 "big cannon hole," so called because during the Penang Riots the Government fired a cannon shot into this place where the people of the Toā Peh Kong 大伯公 otherwise known as the Kièn Tek 建德 Kong-si encamped.

Carnarvon Street: PART I., between Chulia Street and Campbell Street, *Hokkien*, Toā-mûi^{n}-laû hoâi ke 大門樓橫街 "Chulia Street, Cross Street"—the street branching off from Chulia Street. *Cantonese*, Tai-mun-lau wang kai 大門樓橫街

PART II. between Campbell Street and the Station. *Hokkien*, Hoan-á thióng 番仔塚 "foreigners' cemetery" the old Malay cemetery. *Cantonese*, Ma-lai fau 嗎嚟墳

PART III., between Acheen Street and Prangin Road, (1) *Hokkien*, Lam Chhân-á 沓田仔 "poor fields"= swamp; it was formerly nothing but a swamp. *Cantonese*, Chho thong 草塘 "grass pond"=swamp. (2) *Hokkien*, Sì-kak Chí^{n} 四角井 "square well"; formerly there was a square well near the junction of Kimberley Street. (3) *Hokkien*, Cháp-keng chhù 十間厝 "ten houses"; formerly there was a row of ten houses of the same height there. (4) *Hokkien*, Sì^{n} Tiu^{n} Kong-si ke 姓張公司街 called after the Kong-si house of the seh Tiu clan. *Cantonese*, Shing Chung Kong-si kai 姓張公司街

Carnarvon Lane: *Hokkien*, Kàm-kong laī 鑑先內

"Kampong inside," within the Kampong (or village) so called because formerly there was a Kampong in this locality. *Cantonese*, Kam-pong lai 金榜內

Cecil Street: *Hokkien*, Kòe Káng-á tē chhit tiaû lō· 過港仔第七條路 "passed rivulet, number seven street" i. e. the seventh street after crossing the Prangin Ditch from Beach Street. *Cantonese*, Kwo kong chai tai chhat thiu lo 過港仔第七條路

Che Em Lane: *Hokkien*, Pak Kan lai 北間內 "pak kan inside"; pak kan is the Chinese pronunciation of the Malay word pekan, a village.

China Street: *Hokkien*, Toā ke 大街 "big street," i. e., the principal street where the Chinese formerly carried on business. *Cantonese*, Kun yam miu chek kai 觀音廟直街 "Kun Yam Temple straight street." The street going straight from the Temple of the Goddess of Mercy.

China Street Ghaut: (1) *Hokkien*, Toā-ke lō·-thaû 大街路頭 *Cantonese*, Kun-yam-miu-chek-kai lo-thau 觀音廟直街路頭 (2) *Hokkien*, Bêng san lō·-thaû 明山路頭

Bêng san, Mr. Khoo Bêng San, a Chinese merchant, had a shop there.

Chowrasta Road: *Hokkien*, Kiet-lêng-á lān-san 吉寧仔萬山 "Kling market," i. e., the Chowrasta market, where the fish and meat sellers are principally Klings; the word Bān-san being a corruption for the Malay word Bangsal. (Tamil street has the same name.) *Cantonese*, Kit-lêng pá-sat

吉寧巴氹 "Kling market," pá-sat being a corruption of the Malay word pasar.

Chulia Street: PART I., between Beach Street and Pitt Street. (1) *Hokkien*, kiet-lêng-á ke 吉寧仔街 "Kling Street," so called from the Kling shop-keepers there. The word Chulia itself is a Bengali word meaning Kling. (Vide King street PART IV). *Cantonese*, kit-ling kai 吉寧街 (2) *Hokkien*, lô͘-lîn ke 羅巽街 Lô͘-lîn is the Chinese pronunciation for Noordin and ke means street, so called after the business premises of Mr. H. M. Noordin. *Cantonese*, Yi sheung kai 衣箱街 "clothes box street," from the Chinese cabinet-makers' shops there.

PART II., between Pitt Street and Love Lane. *Hokkien* Toā mûi" laû 大門樓 "big archway"; formerly there were two big archways to a large compound house here (see Sek Chuen Lane). *Cantonese*, Tai mun lau 大門樓

PART III., between Love Lane and Penang Road. *Hokkien* gû-kan-tàng 牛干冬 "cattle pen"; gû means cattle and kan-tàng is the Chinese pronunciation for the Malay word "kandang" meaning a pen. *Cantonese*, Sha kong thau 砂岡頭 "sand hill head," in former days people used to deposit rubbish there which heaped up in a mound.

Chulia Street Ghaut: (1) *Hokkien*, kiet-lêng-á-ke lō͘-thâu 吉寧仔街路頭 (vide Chulia Street, PART I.) *Cantonese*, kit-ling-kai lo-thau 吉寧街路頭 (2) *Hokkien*, Si" Iû" Kong-si ke 姓楊公司街 called after the Kong-si house of

the Seh Iu clan. *Cantonese*, Shing Yeung Kong-si kai 姓楊公司街 (3) *Hokkien*, Chhâ lō͘-thaû 柴路頭 "firewood landing-place"; firewood used to be sold there, before Maxwell Road, now a principal place for selling firewood, was constructed. (4) *Hokkien*, Toā chúi chíⁿ 大水井 "big water well"; formerly there was a big water tank there (*vide* Pitt street PART III).

Chulia Lane: *Hokkien*, Cháp-chhit keng 十七間 "Seventeen houses" there was a row of seventeen houses of the same size there. *Cantonese*, Shap-chhat kan 十七間

Church Street: *Hokkien*, Gī-hin ke 義興街 "Gī-hin street" after the Kong-si house of the Gī hin secret society, which stood where now the family residence of Captain Ah Quee is. *Cantonese*, Yi hing kai 義興街

Church Street Ghaut: (1) *Hokkien*, Gī-hin-ke lō͘-thaû 義興街路頭 *Cantonese*, Yi-hing kai lo-thau 義興街路頭 (2) *Hokkien*, Chiú lō͘-thaû 酒廊路頭 "distillery landing-place"; the distillery stands at the junction of Church Street and Beach Street and belongs to the Spirit Farm.

Cintra Street: (1) *Hokkien*, Sin-ke hoaiⁿ ke 新街橫街 "Campbell Street, Cross Street"—the street crossing Campbell Street. *Cantonese*, San kai wang kai 新街橫街 (2) *Hokkien*, Phah phaù ke 打炮街 the street where brothels of the lowest type are. *Cantonese*, Ta Phan Kai 打炮街 That part of this street which runs between Chulia Street and Campbell Street is often called Jît-pún ke 日本街 meaning Japanese Street—the street where the Japanese brothels are. *Cantonese*, Yat pun chai kai 日本寨街 "Japanese brothel street."

Dato Kramat Road: PART I., between Magazine Station and Dato Kramat Station. *Hokkien*, Kam-á hūi" 柑仔園 "orange plantation"; formerly there was a big orange plantation there. *Cantonese*, Kam chai ün 柑仔園

PART II., between Dato Kramat Station and the Prisons. *Hokkien*, Sì-khàm tiàm 四坎店 "four shops"; there were only four shops there before. *Cantonesè*, Si kan tim 四間店

Downing Street: (1) *Hokkien*, Goā koan 外關 "outer Government office"=Chinese Protectorate, which stands in this street. *Cantonese*, Man wa kun 問話舘 "asking question house"; house where female immigrants from China are examined=Chinese Protectorate. (2) *Hokkien*, Tāi jin koan 大人關 "the Taijin's office"=the Chinese Protectorate. *Cantonese*, Phai kun 牌舘 "license-house" i.e., the house where licences under the Contagious Disease Ordinance were issued=Chinese Protectorate.

Drury Lane: *Hokkien*, Sin hì-tâi 新戲臺 "new theatre" after the new Chinese theatre there. *Cantonese*, san hi-ün 新戲園

Esplanade Road: *Hokkien*, Chhaú-po· haí-ki" lō· 草埔海墘路 "grass field seaside road"=road at the sea-side of the Esplanade. *Cantonese*, Ta po· te hoi phe 打波地海皮 "striking ball place sea-side." (2) Sin kau chheung hoi phe 小較塲海皮 small parade ground sea-side."

Farquhar Street: PART I., between Pitt Street and Love Lane. *Hokkien*, âng mô· ȯh chêng 紅毛學前 "red hair school front," the front of the Penang Free School.

PART II., between Love Lane and Leith Street. (1) *Hokkien*, Liên hoa hô· 蓮花湖 "lotus pond," so called after a big lotus pond formerly situated at the side of the St. George's Girl School, the pond having been filled up some years ago on account of the many accidents to people in attempting to get at the lotus. (2) *Hokkien*, sek-lân-ni (serani) ȯh chêng 色蘭乳學前 "serani school front."

PART III., between Leith Street and Northam Road. *Hokkien*, âng mô· lō· 紅毛路 "red hair road" the road where Europeans live. (Northam Road has the same name.)

Fish Lane: *Hokkien*, kiâm hû-á hāng 鹽魚仔港 "salt-fish lane," because it branches off from Prangin Lane, which is called the 'Salt-fish yard.' *Cantonese*, ham ü hong 鹽魚港

Gladstone Road: *Hokkien*, hoé chhia lō· 火車路 "fire carriage road"; the fire carriage is the Tramway. *Cantonese* Fo chhe lo 火車路

Green Hall: (1) *Hokkien*, toān pá-lí 緞巴尼 Mr Paddy (Pali) formerly owned a large portion of land here. (2) *Hokkien*, ki-lin hō· 麒麟虎 a corruption for Green Hall.

Heriot Street: *Hokkien*, koè káng-á tē pe̍h tiaû lō· 過港仔第八條路 "passed rivulet, number eight street;" i.e. the eighth street after crossing the Prangin Ditch from Beach Street. *Cantonese*, kwo kong chai tai pat thiu lo 過港仔第八條路

Hong Kong Street: *Hokkien*, Hiang káng lō· 香港路 hiang káng is the Hokkien pronunciation of Hongkong.

Cantonese, Heung kong kai 香港街 heung kong is the Cantonese pronunciation of Hongkong, and kai means street. (The word Hong itself is a mispronunciation of heung originating from the boat-population of Canton who were the first to come in contact with Europeans when they appeared in China).

Hospital Road: *Hokkien*, Pī chhù lō· 病厝路 "sick house road"=road leading to the General Hospital. *Cantonese*, Wong ka yi im lo 王家醫院路

Hutton Lane: *Hokkien*, Gia-lâu (jalan) a-téng 惹蘭亞丁 a-teng is the Chinese pronunciation for Hutton.

Jelutong Road: *Hokkien*, Jit-lóh-tōng lō· 日落洞路 jit-lóh-tōng is the Chinese pronunciation for Jelutong. The town end of this road is called ē-tōng 下洞 or hē-tōng 下洞 which means the lower tōng, and the country end of this road is called téng-tōng 頂洞 or siāng-tōng 上洞 which means the upper tōng, i. e., cave. *Cantonese*, Yat lok tong.

Katz Street: *Hokkien*, Koè káng-á tē lák tiaû lō· 過港第六條路 "passed rivulet, number six street," i. e., the sixth street after crossing the Prangin Ditch from Beach Street. *Cantonese*, Kwo kong chai tai luk thiu lo 過港仔第六條路

Kedah Road: *Hokkien*, Kām kong mâ lák kah 鑑光麻六甲 "Kampong Malacca." *Cantonese*, Ku phai kun 舊牌舘 "old license house"; this referring to the Lock Hospital, which was formerly situated at the site where the present Chowrasta Dispensary is.

Keng Kwee Street: *Hokkien*, Kéng kùi ke 景貴街 named after Captain Ah Quee, who built this street and connected it with Penang Road. *Cantonese*, Keng kwai kai 景貴街

Kimberley Street: (1) *Hokkien*, Tio-chiu ke 潮洲街 Te chiu is the name of a prefecture in the Quang-tung Province in South China, better known as Chao-chow-fu 潮洲府 from which the Te-chiu people come. This street is so called because formerly there were many China-born Te-chiu prostitutes living there. Owing, however, to the prohibition of female emigration from Swatow, which is the sea-port of Chao-chow-fu, by the Chinese Government upon representations being made by the Te-chiu merchants in the Straits Settlements, all Te-chiu prostitutes have since disappeared from this street. *Cantonese*, Chiu chau mui kai 潮洲妹街 "chiu chau girl street." (2) *Hokkien*, Soaⁿ-thaû ke 汕頭街 "Swatow street." (3) *Hokkien*, Mīⁿ soàⁿ ke 麪線街 "vermicelli street," so called after the vermicelli makers there. (4) *Hokkien*, Siⁿ Tiⁿ kong-si ke 姓鄭公司街 after the Kong-si house of the seh Tiⁿ clan, which was formerly in this street. (5) *Hokkien*, Phah soh-á hāng 打索仔巷 "striking rope street" formerly there were some rope makers' shops there. (Rope Walk is sometimes called by this name a'so.)

King Street: PART I., between Light Street and Bishop Street. *Hokkien*, Kaú-keng-chhù aū 九間厝後 "Penang Street back" (*vide* Penang Street, Part I.)

PART II., between Bishop Street and China Street. (1)

Hokkien, Kúi^{n}-tang toā peh kong ke 廣東大伯公街 Kúi^{n}-tang is the *Hokkien* pronunciation of Quang-tung, a province in South China. Toā peh kong means god, so called because there is a temple there built by subscriptions raised solely from the *Cantonese*. *Cantonese*, Kwong-tung tai pak kung kai 廣東大伯公街 (2) *Hokkien*, À-phiàn kong-si ke 亞片公司街 "Opium farm street," so called after the Opium and Spirit Farms at the junction of China Street. *Cantonese*, In kung-si 煙公司

PART III., between China Street and Market Street. *Hokkien*, Kū Hô-seng kong-si ke 舊和勝公司街 Hô-seng is the name of a secret society, which formerly had its Kong-st house there. *Cantonese*, Kau wo shing kung-si kai 舊和勝公司街

PART IV., between Market Street and Chulia Street. *Hokkien*, Kiet-lêng-á ke 咭𠯿仔街 "Kling Street"; this par of King Street was formerly inhabited chiefly by Klings (*vide* Chulia Street, Part I.) *Cantonese*, Pak kap lung 伯鴿籠 'Pigeon hole," so called because formerly there were some exceedingly small houses there occupied as brothels.

Kulim Lane: (1) *Hokkien*, Bān an tâi 萬安臺 "Bān an theatre," so called after the name of the Chinese theatre in this lane. *Cantonese*, Mau on thoi 萬安臺 (2) *Hokkien*, Bêng hì-tâi 明戲臺 "Bêng's theatre"; bêng is a part of the name of Mr. Ong Bêng Tek, the former proprietor of the theatre.

Kuala Kangsa Road: *Hokkien*, Hoan-á hì-hûi^{n} ke 番仔戲園街 "foreigners' theatre," so called from the Malay theatre there.

Cantonese, Ma-lai hiin kai 嗎獵戲園街 "Malay theatre street."

Leith Street: *Hokkien*, Siang hó chhù chêng 相好厝前 "Siang ho's house front."

Light Street: *Hokkien*, Po lê khaú 玻璃口 "Police mouth" entrance to the Police Courts. *Cantonese*, Po-le-si chhiu 玻璃士前 "Police front."

Love Lane: *Hokkien* Sek-lân-ni (Serani) bāng 色鬻乳巷 Eurasian lane, this lane was formerly inhabited chiefly by Eurasians.

Cantonese, PART I., between Farquhar Street and Muntri Street; Shap-tsz-ka lai-pai-thong pin 十字架禮拜堂邊 "Cross Church side"; the church referred to is the church of Assumption.

PART II., between Muntri Street and Chulia Street. (1) Ma shui hau 孖水喉 "double water pipe," formerly there were two public stand-pipes there standing side by side. (2) Lo pau miu kai 魯班廟街 "lo pau temple street" the street where the Temple of the God of Carpentry is. This lane is sometimes called lat-le hong by the Cantonese, lat-le being a mispronunciation for Love Lane and hong meaning lane.

MacAlister Road: *Hokkien*, Tiong lō· 中路 "middle road," i.e., the middle road of the six roads meeting at Magazine

Cantonese, Chung lo 中路

MacCallum Street: *Hokkien*, Kòe káng-á tē gō· tiaû lō

過港仔第五條路 "passed rivulet, number five street" i. e., the fifth street after crossing the Prangin Ditch from Beach Street. *Cantonese*, Kwo kong chai san lo 過港仔第五

Magazine (the open space formed by the intersection of the six roads in front of the Magazine Police Station). (1) *Hokkien*, Chhèng ióh keng 銃藥間 "gun-powder depot" formerly the Government gun-powder magazine was there. *Cantonese*, Fo yeuk kuk 火藥局 (2) *Hokkien*, Gō· pha teng 五枝燈 "the five lamps" referring to the Municipal lamp-post which holds five lamps. *Cantonese*, Ng chan tang 五盞燈 (3) *Hokkien*, Lák chhē lō· 六叉路 "the intersection of six roads" viz., Magazine Road, Gladstone Road, Penang Road, MacAlister Road, Dato Kramat Road and Brick-kiln Road. The Malay version of this name is Simpang Anam. *Cantonese*, Luk a lo 六叉路

Magazine Road: *Hokkien*, Kòe káng-á tē it (or thaû) tiaû lō· 過港仔第一條路 "passed rivulet, number one street," i.e., the first street after crossing Prangin Ditch from Beach Street. *Cantonese*, Kwo kong chai tai yat thiu lo 過港仔第一條路

Malay Street: *Hokkien*: Thâi gû hāng 剖牛巷 "killing cows lane," cattle were formerly slaughtered there for the market. It is also called Thaî gû aū 割牛巷 the back of the place where cows were killed. *Cantonese*, Thong ngau hong.

Malay Street Ghaut: *Hokkien*, Thâi gû hāng lō·-thaû

剖牛巷路頭 *Cantonese*, Thong-ngau-hong lo thau 割牛巷路頭

Market Lane: *Hokkien*, Kóng hok kū hāng 廣福居巷 kong hok ku is the Chinese name of the Penang Mutual Improvement Association the premises of which are in of this lane. *Cantonese*, Yi-nai hong 二奶巷 "concubine lane," so called because this lane used to be occupied chiefly by kept women.

Market Street: *Hokkien*, Pá-sat ke 巴𠮶街 pá sat is a corruption for pasar, a Malay word meaning market. *Cantonese* Pa-sat kai 巴𠮶街

Market Street Ghaut: *Hokkien*, Sin bān-san 新埕山 "the new market," i. e., the Central market. Bān-san is a corruption of the Malay "bangsal", meaning a shed. *Cantonese*, San pat sat 新巴𠮶 "new pasar

Maxwell Road: PART I., between Bridge Street and Gladstone Road. *Hokkien*, Chhâ tiâⁿ 柴埕 "firewood yard"; this is the principal place where firewood is sold in Penang.

PART II., between Gladstone Road and Penang Road. *Hokkien*. Khai Hêng Bí bí-ka 開恒美米絞 'Chop Khie Heng Be's rice mill. N. B. This road and Prangin Road are often called káng-á kiⁿ 港仔墘 "rivulet side" because of their proximity to the Prangin Ditch.

Muda Lane: *Hokkien*, Thái-ko hāng 癩哥巷 "leper's lane", many lepers used to live in this place on the charity of a certain wealthy Chinaman.

Muntri Street: (1) *Hokkien*, Sek-lân-ni hāng 色蘭尼巷 Eurasian lane. (2) *Hokkien*, Lâm hoa i-īⁿ ke 南華醫院街 "Lâm hoa hospital street," after the Chinese medical institution there. *Cantonese*, Nam wa yi iin kai 南華醫院街 (3) *Hokkien*, Sin haí-lâm kong-si ke 新海南公司街 "new Hailam kong-si street," after the new Kong-si house of the Hailams. *Cantonese*, San hoi nam kung-si kai 新海南公司街

Noordin Street: *Hokkien*, Koè káng-á tē jī tiaû lō· 過港仔第二條路 "passed rivulet, number two street' i. e., the second street after crossing the Prangin Ditch from Beach Street. *Cantonese* Kwo kong chai tai yi thiu lo 過港仔第二條路

Northam Road: *Hokkien*, Aⁿg mô· lō· 紅毛路 "red hair road"=road where the Europeans live. That part of this road which joins Penang Road is sometimes called âng mô· kū thióng 紅毛舊塚 "red hair old cemetery", i. e., the Protestant and Roman Catholic Cemetery there. *Cantonese*, Hung mo lo 紅毛路

Penang Road: PART I., about Chulia Street. *Hokkien*, Tiaû-lâng ke 吊人街 "hanging people street"—formerly criminals were hung there. *Cantonese*, Tiu yan kai 吊人街

PART II., about Chowrasta market. (1) *Hokkien*, Kū kha-khu 舊脚墟 "old jail"=the old Criminal Prison, which was formerly situated at the present vacant piece of ground opposite the Chowrasta market. *Cantonese*, Kau ka-ku 舊脚墟 (1)

Hokkien, Lêng chiak chhù chêng 寧爵厝前 "Leng Cheak's house front."

PART III., about the Prangin Ditch. *Hokkien*, Tiaù kiô thaû 吊橋頭 "suspension bridge head," i. e., the bridge over the Prangin Ditch. This name is sometimes, though improperly, applied, to those parts of Prangin Road, Maxwell Road and Burmah Road which join Penang Road at the Prangin Ditch; the general name for the whole district round about here is Titi Papan, meaning wooden bridge. *Cantonese*, Tiu khiu thau 吊橋頭

PART IV., about the Magazine Police Station. *Hokkien*, Lâng chhia tèng pâi koan 人車釘牌舘 "rickshaw nailing licence office" = the rickshaw registration department.

Penang Street: PART I., betweeen Light Street and Bishop Street. *Hokkien*, Kaú keng chhù 九間厝 "nine houses"; formerly there were only nine housees in this part of Penang Street on the right hand side as one goes up from Light Street.

PART II., between Bishep Street and Market Street. (1) *Hokkien*, Kúi^{n}-tang ke 廣東街 Kúi^{n}-tang = Quang-tung Province in Southern China and ke = street; so called because this part of Penang Street is principally occupied by Cantonese shopkeepers. *Cantonese*, Kwong-tung kai 廣東街 kwong-tung = Quang tung Province; kai = street. (2) *Hokkien*, Má-káu ke 馬交街 "Macao Street"; *Cantonese*, Thong-yan kai 唐人街 "Chinamen's street"; the word Chinaman refers to the Cantonese in distinction from the Hokkiens, whom the former considered to be foreigners on account of their different provinciality.

PART III., between Market Street and Chulia Street *Hokkien*, Che-tî ke 齊知街 "chetty street," from the chetty money-lenders living there.

Perak Road: *Hokkien*, Toā lō· aū 大路後 "big road back,"=behind the big road.

Phee Choon Lane: *Hokkien*, Phi Chun lō· 丕俊路 Phe Choon is a part of the name of Mr. Li Phee Choon.

Pitt Lane: *Hokkien*. Tio-chiu kong-si aū 潮洲公司後 "Te-chiu Kong-si back," behind the Te-chiu Kong-si house in Chulia Street, where it joins Queen's Street. *Cantonese*, Chhiu Chau Kung-si au 潮洲公司後

Pitt Street: PART I., between Light Street and China Street. *Hokkien*, Koan im têng chêng 觀音亭前 "Koan im temple front," front of the temple of the Goddess of Mercy. The Straits-born women often pronounce Klam or Kolam instead of koan im, by way of contraction. *Cantonese*, Kun yam miu chhin 觀音廟前

PART II., between China Street and Chulia Steet. *Hokkien*, Toā ba-lai 大峇倅 "big balei"; the Balei is the Pitt Street Police Station. *Cantonese*, Tai mata liu 大孖打寮 "big police house."

PART III., between Chulia Street and Armenian Street. *Hokkien*, Toā chúi chí" 大水井 "big water well"; formerly there was a big water tank there. *Cantonese*, Tai mun lau kai-si 大門樓街市 "Chulia Street market." [Vide Chulia Street

Ghaut (4)] (2) *Hokkien*, Iâ kha 椰脚 "coco-nut foot"; there were many cocoa-nut trees there.

Prangin Road: PART I., between Beach Street and Carnarvon Street. (1) *Hokkien*, Oân thâu-á 灣頭仔 "the small turning," i. e., the turning from Beach Street. *Cantonese*, Wan thau chai 灣頭仔 (2) *Hokkien*, Hūi Chiu Kong-si ke 惠洲公司街 "the street where the Kong-si house of the Hūi chiu people is. Hūi Chiu is the name of a prefecture in South China whence the Khehs or Hakkas come. *Cantonese*, wai chau kung-si kai 惠洲公司街.

PART II., between Carnarvon Street and Sungei Ujong. *Hokkien*, Khai Hêng Bí ke 開恒美街 the street where Chop Khie Heng Be (rice merchant) is. *Cantonese*, Hoi Hang Mi kai 開恒美街.

PART III., between Sungei Ujong and Penang Road. *Hokkien*, Gû chhia ke 牛車街 "bullock-cart street," from the bullock-cart builders' shops there. N. B. This road and Maxwell Road are often called Káng-a kî" 港仔墘 "the rivulet side," because of their proximity to the Prangin Ditch. *Cantonese*, Ngau chhe kai 牛車街

Prangin Lane: *Hokkien*, Kiâm hû tiâ" 鹽魚埕 "salt-fish yard," so called because salt-fish are dried and cured there, i. e., at the back part of the shops facing Prangin Road.

Presgrave Street: *Hokkien*, Koè káng-á tē sa" tiaú lō· 過港仔第三條路 "passed rivulet, number three street,'

i, e, the third street after crossing the Prangin Ditch from Beach street. *Cantonese*, Kwo kong chai tai sam thiu lo 過港仔第三條路

Queen Street: (1) *Hokkien*, Chap-jī keng 十二間 "twelve houses," there is a row of twelve houses of the same height. *Cantonese*, Shap yi kan 十二間 (2) *Hokkien*, Kū Hô Hap siā ke 舊和合社街 "old Ho Hap society street," called after the Kong-si because of this society there. *Cantonese*, Kau Wo Hap she kai 舊和合社街

Race Course Road: *Hokkien*, Toā chhài hûi" lō· 大菜園路 ."big vegetable garden road," from the many vegetable plantations there. *Cantonese*, Tai chhoi un 大菜園

R. C. O. Front: *Hokkien*, Koan-á kak 關仔角 "Government office corner"= the corner of the Government offices. *Cantonese*, Tai ma-thau 大馬頭 "big jetty," after the Old Jetty there.

Residency Road: *Hokkien*, Jī ông chhù lō· 二王厝路 "Second King's house road," second King being the Chinese way of calling the Resident Councillor.

Rope Walk: (1) *Hokkien*, Gī-hok ke 義福街 "Gī hok street," so called because the Gī hok secret society had their Kong-si house there formerly. *Cantonese*, Yi fuk kai 義福街 (2) *Hokkien*, Phah soh hāng 打索巷 "making rope lane"; formerly cocoanut husk ropes were manufactured there. [Vide Kimberley Street (5)]

Sandilands Road: *Hokkien*, Koè káng-á tē kaú tiaû lō· 過港仔第九條路 "passed rivulet, number nine street," i.e., the ninth street after crossing the Prangin Ditch from Beach Street. *Cantonese*, Kwo kong chai tai kau thiu lo· 過港仔第九條路

Scotland Road: *Hokkien*, Batu Gantong 峇抵眼東 Malay, overhanging rock; there is a big overhanging rock there.

Seh Tan Court: *Hokkien*, Sī" Tân kong-si 姓陳公司 after the Kong-si house of the Seh Tan clan. *Cantonese*, Shing chau Kung-si 姓陳公司

Sek Chuan Lane: *Hokkien*, Toā mûi" laû laī 大門樓內 "big archway inside"= within the big archway; there was a big compound house there with two entrances, over each of which there was a big archway, the present Sek Chuan Lane being formerly one of the two entrances. (*Vide* Chulia Street, PART II.) *Cantonese*, tai mun Tau lung 大門樓龍

Stewart Lane: *Hokkien*, Koan im têng aū 觀音亭後 "Koan im temple back" = behind the temple of the Goddess of Mercy. *Cantonese*, Kun yam miu hau 觀音廟後

Sungei Ujong: (1) *Hokkien*, Hô· chio tiâ" 胡椒埕 "Pepper yard," from the court-yard there where pepper is exposed to be dried. (2) *Hokkien*, Bān Tek Hong lō· 萬得豐路 the road where chop Ban Tek Hong owns the pepper yard above referred to is situated. *Cantonese*, Man tak fung kai 萬得豐街

Tamil Street: *Hokkien*, Kiet-lêng bān san 吉寧萬山 "Kling market." *Cantonese*, Kit-ling pa-sat 吉寧巴虱

Tek Soon Street: (1) *Hokkien*, Tek Sūn lō· 德順路 (2) *Hokkien*, Chhâ tiâⁿ aū 柴埕後 "Maxwell Road back" (*Vide* Maxwell Road, Part I.)

Thye Sin Street: *Hokkien*, Koè káng-á tō sì tiaû lō 過港仔第四條路 "passed rivulet, number four street. i. e., the fourth street after crossing the Prangin Ditch from Beach street. *Cantonese*, Kwo kong chai tai si thin lo 過港仔第四條路

Toa Aka Lane: (1) *Hokkien*, Phah-thih-ke hāng-á 打鐵街巷仔 "Beach street small lane," the lane that branches off from Beach street (*Vide* Beach street, Part V.). *Cantonese*, Ta-thit kai hong chai 打鐵街巷仔 (2) *Hokkien*, Kàm-kong-laī hoaiⁿ lō· 鑑光內橫路 "Carnarvon Lane cross street." *Cantonese*, Kam-pong loi wang kai 金榜內橫街

Transfer Road: *Hokkien*, Tek Sūn chhù piⁿ ke 德順厝邊街 "Tek Soon's house side street." *Cantonese*, Tak shun ok pin 德順屋邊

Union Street: *Hokkien*, Po-lê aū 玻璃後 "Police back" = behind the Police Courts. *Cantonese*, Po-li-si hau 玻璃司後

Waterfall Road: *Hokkien*, A ék tò-lūn 亞逸倒潤 the Chinese pronunciation for Ayer Terjun, which means 'water plunging.'

Weld Quay: *Hokkien*, Haí kiⁿ sin lō· 海墘新路 'sea-beach new road," or Sin haí kiⁿ ke 勒海墘街 "new sea-beach road." *Cantonese*, Hoi phe 海皮 "sea-beach."

Western Road: *Hokkien*, Aⓝ̂g mô· sin thióng 紅毛新塚 "red hair new cemetery," so called after the European new cemetery there. Sai hoa hāng 西華巷 the Western grand lane. Pêng an hāng 平安巷 the happy lane. *Cantonese*, San hung mo fan 新紅毛墳 "new red hair cemetery." Sai wa hong 西華巷 Pheng on hong 平安巷

GOVERNMENT OFFICES.

R. C. O. *Hokkien*, Jī ông koan 二王關 "No. 2 King's office"; the Governor being the No. 1 King.

Treasury: *Hokkien*, Kong-pān-gê khò·-pâng 公班衙庫房 kong-pān-gê is the Chinese pronunciation for company, i. e., the East India Company, the Government; and khò·-pâng means treasury. *Cantonese*, Fu-fong 庫房 "treasury."

Stamp Office: (1) *Hokkien*, Bē ang-á thaû ê koan 賣甴仔頭之關 "Selling doll-head Office." *Cantonese*, Mai kung chai thau nga mun 賣公仔頭衙門 "selling doll-head ya-men." (2) *Hokkien*, si-tàn koan 寔担關 si-tàn = stamp, and koan means office. *Cantonese*, Si tam kun 士担舘

Public Works Department: *Hokkien*, Niû tē koaⁿ 量地官 "measuring land official." *Cantonese*, Leung te kun 量地官

Land Office: (1) *Hokkien*, Gâ-lân koan 牙蘭關 gâ-lân = grant. *Cantonese*, Thiu tho thien 田土廳 field land department." (2) *Hokkien*, Tē cho· koan 地租關 "land rent office."

Official Assignee's Office: *Hokkien*, Pó kiông si 報窮司 "Reporting poverty Official." *Cantonese*, Po khung is 報窮司

Chinese Protectorate: (1) *Hokkien*, Goā koan 外關 "Outer Office" = the office that transacts business with the general public. *Cantonese*, Phai kun 牌舘 "Licence house" = house where licences under the C. D. O. were issued. (2) *Hokkien*, Taī-jîn koan 大人關 Taī-jîn literally means a great man, but in Chinese official circles it is used as a title applying to any mandarin of and above the rank of a Taotai, equivalent in English to His or Your Excellency. *Cantonese*, Mau wa kun 問話舘 "asking questions house" = house where female immigrants from China are examined under the Women and Girls' Protection Ordinance. (3) *Hokkien*, Hō·-ùi si koan 護衛司關 "Protecting Official's Office" office of the Protector (of Chinese). *Cantonese*, Tai yan nga mun 大人衙門 "Tai-jin's yamen. (4) *Hokkien*, Chèng bū si koan 政務司關 "the government business official's office." *Cantonese*, U wai si nga mun 政務

司衙門 "Protector's yamen". (5) Cheng mo si nga mun "government business official's yamen."

Marine Department: *Hokkien*, Haí koan 海關 "Harbour Office." *Cantonese*, Hoi kwan 信舘

General Post Office: *Hokkien*, Phe koan 批關 "Letter Office." *Cantonese*, Shun koan 海關

Supreme Court: *Hokkien*, Toā kók 大咯 "big court, kók being the Chinese pronunciation for court. *Cantonese*, Tai kot 大葛 "big court."

Solicitor General's Department: *Hokkien*, Kong-pān-gê chīg su 公班衙狀師 kong-pān-gê = company, i.e., the East Indian Company, and chīg su means a lawyer. *Cantonese*, Wong ka chong si 王家狀師 "Government lawyer."

Sheriff Department: *Hokien*, Che-lip 奢立 this is the Chinese pronunciation for Sheriff. *Cantonese*, Fung pho kun 封舖官 "sealing shop official." (2) *Hokkien*, Hong chhù koa" 封厝官 "Sealing house official." (3) *Hokkien*, Lê-long koa" 咧郎官 Lelong is a Malay-Portuguese word meaning auction, and koa" means official.

Police Courts: *Hokkien*, Po-lê 玻璃 "police." *Cantonese*, Po-le-si 玻璃司 "police."

Coroner's Department: *Hokkien*, Giām si koa" 驗屍官 "examining corpse official." *Cantonese*, Im si kun 驗屍官

Police Superintendent's Office: *Hokkien*, Goā po-lê-chú 外玻璃主 "outer police magistrate." *Cantonese*, San sham lau 新審樓

Police Station: (1) *Hokkien*, Má-tá" liaû 馬打寮 "police house." *Cantonese*, Mata liu 馬打寮 (2) *Hokkien*. Ba lai 峇賚 the Malay word balai, a station.

Detective Police Station: *Hokkien*, Âm pai keng 暗牌間 "secret badge house"; detectives are called "secret badge," because they, not wearing any uniform, are supposed to wear a police badge secretly on their persons. *Cantonese*, Am phai kun 暗牌舘

Marine Police Station: (1) *Hokkien*, Sūn haí má-tá" liaû 巡海馬打寮 "inspecting sea police house." *Cantonese*, Shui si mata liu 水師馬打寮 shui si means marine. (2) *Hokkien*, Sūn haí ba laí 巡海峇賚

Criminal Prison: *Hokkien*, Kha khu keng 脚楜間 "foot-fettering house." *Cantonese*, Kam fong 監房 "confining house"

Debtor's Prison: *Hokkien*, Khiàm chà kha khu keng 欠債脚楜間 "Owing debts prison." *Cantonese*, Chhin chai kam 錢債監 "Debt prison."

General Hospital: *Hokkien*, Pī" chhù 病厝 "Sick house." *Cantonese*, Yi shang kun 醫生舘 (2) *Hokkien*, Ló kun chhù 老君厝 "Doctor's house."

MERCANTILE OFFICES.

Chamber of Commerce: *Hokkien*, Âng mô siang kong-si 紅毛商公司 "European merchants' Kong-si." *Cantonese*, Sai yan sheung mo kuk 西人商務局 "Western people's commercial business board."

Hongkong & Shanghai Bank: (1) *Hokkien*, Hui hong bang 匯豐𠊎 Hui hong being the Chinese chop of this bank and bang=bank. *Cantonese*, Ui fung ngan hong 匯豐銀行 Ui fung being the Chinese chop of this bank, and ngan hong means money firm-bank. (2) *Hokkien*, Siāng haí bang 上海𠊎 "Shanghai bank." *Cantonese*, Shung hoi ngan hong 上海銀行 "Shanghai bank."

Chartered Bank; *Hokkien*, Cha-ta bang 查陸𠊎 "Chartered Bank." *Cantonese*, Cha-ta ngan hong 查打銀行 "Chartered Bank."

Netherlands Trading Society: *Hokkien*, Hô-lân bang 和蘭𠊎 "Holland bank." *Cantonese*, Ho-lan ngan hong 和蘭銀行

Telegraph Office: *Hokkien*, Phah tâng soà" koan 打銅線關 "striking brass wire office." *Cantonese*, Tin po kuk 電報局 "electricity report board."

Tin Exchange: (1) *Hokkien*, Chip siang só· 集商所 "assembling merchant's place. *Cantonese*, Chap sheung so 集商所 (2) *Hokkien*, Siak Kong-si 錫公司 "the tin Kong-si." *Cantonese*, Shek kung-si 錫公司

Opium and Spirit Farms: (1) *Hokkien*, A-phièn kong-si 亞片公司 "opium Kong-si." *Cantonese*, Nga phin kong-si 亞片公司 (2) *Hokkien*, Chiú kong-si 酒公司 "Spirit kong-si." *Cantonese*, Chau kong-si 酒公司

Municipal Office: (1) *Hokkien*, Ah sè koan 押栖關 ah sè=the Malay word hasil, meaning tax, and koan means office. (2) *Hokkien*, Chúi sè koan 水栖關 "water rate office." (3) *Hokkien*, Kong pó kiok 工部局 "works department."

Town Hall: *Hokkien*, Ang mô kong koán 紅毛公館 "European club."

Chinese Town Hall: *Hokkien*, Pêng cheang kong koán 平章公館 *Cantonese*: Pheng cheung kung kun 平章公館

The Medical Institution: *Hokkien*, Lâm hoa i ⁱⁿ 南華醫院 *Cantonese*, Nam wa gi ün 南華醫院

St. George's Church: *Hokkien*, Ang mô toā lé-pài-tn̂g 紅毛大禮拜堂 "European big church."

Church of Assumption: *Hokkien*, Sek-lân-ni lé-pài-tn̂g 色蘭乳禮拜堂 "Eurasian Church."

Armenian Church: *Hokkien*, Lū-sòng lé-pài-tn̂g 呂宋禮拜堂 lū sòng being a corruption for Luzon of the Philippines Islands, and lé-pài-tn̂g means Church.

Penang Free School: *Hokkien*, Ang mô͘ óh 紅毛學 "European school".

St. Xavier's Institution: *Hokkien*, Sek-lân-ni óh 色蘭乳學 "Eurasian School."

St. George's Girls' School: *Hokkien*, Lú óh 女學 "girls' school".

Convent: *Hokkien*, Nî ko am 尼姑庵 "nunnery." *Cantonese*, Ku leung thong 姑娘堂 "ladies' house", the ladies being the nuns.

Government Hill: *Hokkien*, Seng ki soaⁿ 升旗山 "Hoisting flag hill". *Cantonese*, Shing khi san 升旗山

Dato Kramat Gardens: *Hokkien*, Ong ke hoa huiⁿ 王家花園 "Government gardens." *Cantonese*, Wong ke fa ün 王家花園

Waterfall: *Hokkien*, A-ek tò-lūn 亞逸倒崙 "Ayer turjun" = water plunging. *Cantonese*, Shui mo 水磨

Race Course: *Hokkien*, Phaú bé khoan 跑馬環 "running horse field." *Cantonese*, Phau ma chheung 跑馬場

Esplanade: (1) *Hokkien*, Chhaú po· 草埔 "grassfield." *Cantonese*, Siu kau chheung 小較場 "small parade ground." (2) *Hokkien*, Phah kiû po 打球埔 striking ball field." *Cantonese*, Ta po te 打波地 "striking ball land."

Fort Cornwallis: *Hokkien*, Ang mô· siâⁿ 紅毛城 "European city." *Cantonese*, Phau thoi 炮臺 "fort."

New Jetty: (1) *Hokkien*, Thih tō·-thaû 鐵路頭 "iron landing place." (2) *Hokkien*, Thih kiô 鐵橋 "iron bridge."

Old Jetty: *Hokkien*, Koan-á kak pabian 關仔角鋪岸 koan á kak=R. C. O. front, and "pabian" is a Malay word for jetty.

Residency: *Hokkien*, Jī ông chhù 二王厝 "No. 2 King's house."

Chinese Consulate: *Hokkien*, Taī chheng kok lèng sū hú 大清國領事府 "The Great Pure Kingdom Consulate." *Cantonese*, Tai chheng kwok leng si fu 大清國領事府

The Temple of the Goddess of Mercy (in Pitt Street): (1) *Hokkien*, Koan im têng 亭音觀 "Koan Im Temple." *Cantonese*, Kun yam miu 觀音廟 (2) *Hokkien*, Kóng hok kiông 廣福宮 "Quang-tung and Fuhkien temple" = Cantonese and Hokkien temple. *Cantonese*, Kwong fuk kung 廣福宮

The Temple of the God of the Town (in Jelutong): *Hokkien*, Sêng ông biō 城隍廟 the Seng Ong god is supposed to take his appointment from Yama, the ruler of hell, to whom he has to report the doings, good or evil, of the people in the town under his jurisdiction. The Chinese consider this temple to be the most appropriate one for taking oaths, such as that of cutting off cock's heads, etc. *Cantonese*, Shing wong miu 城隍廟

The Temple of the God of Carpentry (in Love Lane): *Hokkien*, Lò· pān kò· biō 魯班古廟 "Lo pan's ancient temple." *Cantonese*, Lo pan ku miu 魯班古廟

The Temple of the Three Precious Ones—the Buddhist Trinity (in Ayer Itam): *Hokkien*, Kek lók si 極樂寺 "Supreme felicity monastery." *Cantonese*, Kek lok chi 極樂寺 (2) *Hokkien*, Sam pó tiēn 三寶殿 "the court of the Three Precious Ones," so called after the shrine of the Buddhist Trinity inside the above-mentioned monastery. *Cantonese*, Sam po tin 三寶殿

The Temple of Philosopher Lao-tsu, the founder of Taoism : *Cantonese*, Chheng koan si 清觀寺 "clear view monastery." This temple is situated at the top of a hill in Paya Rubong, and is approached by a path consisting of a long flight of granite steps known as the Chheng jī chàn 千二層 the 1200 steps. *Cantonese*, Chheng kun chi 清觀寺

The Temple of the Local Deities: (1) *Hokkien*, Toā peh kong 大伯公 *Cantonese*, Tai pak kung 大伯公 (2) *Hokkien*, Pún thaû kong 本頭公 One in King Street, one in Tanjong Tokong, one in Ayer Itam, etc. *Cantonese*, Tho te kung 土地公

The Pleasure Club 燕閒別墅 (in Chulia Street): *Hokkien*, Ièn hân piêt so. *Cantonese*, In han pit sü.

The Penang Literary Association 以文齋 (near the Esplanade): *Hokkien*, I bûn chai. *Cantonese*, I man chai.

The Chinese Club 清芳閣 (in MacAlister Road): *Hokkien*, Chheng hong kók. *Cantonese*, Chhing fong kok.

The Anglo-Chinese Reading Room 萃雅軒 (in Chulia Street): *Hokkien*, Chui nge hiēn 萃雅軒 *Cantonese*, Su nga hin 萃雅軒

CHINESE KONGSI-HOUSES.

A. HOKKIEN. (Names romanised in Hokkien sound.)

Sin Khu 邱	Kong-si Chop	Liōng San Tông	龍山堂	Cannon Square
„ Khu 邱	„	„	Bûn San Tông	文山堂	Weld Quay.

Si^{n} Lîm 林	Kong-si Chop	Kiú Liōng Tông	九龍堂	Beach Street.
„ Tân 陳	„	„	Eng Chhoan Tông	穎川堂	Seh Tan Court.
„ Iû^{n} 楊	„	„	Sù Ti Tông	四知堂	Chulia St. Ghaut
„ Uî^{n} 黃	„	„	Chí Ièn Tông	紫燕堂	Jelutong
„ Tiu^{n} 張	„	„	Chheng Hô Tông	清河堂	Carnarvon St.
„ Chiā 謝	„	„	Pó Sū Siā	寶樹社	Armenian St.
„ Ong 王	„	„	Thaì Guân Tông	太原堂	Penang Road.

B. CANTONESE. (Names romanized in Cantonese sound.)

寧陽會館 Leng yeung ui kun; leng yeung is another name for san leng 新 and ui kun means meeting-house. (In King Street.)

會館 ui kun; ui stands for san ui 新會 and kun means house. (In Bishop Street.)

會寧館 Ui leng kun; here ui stands for si ui 四會 leng stands for kwong leng 廣寧 and kun means house. (In Muntri Street.)

香邑館 Heung yap kun; "heung town house." Heung stands for heung shan 香山 (In King Street).

伍氏家廟 Ng shi ka miu; "Surname Ng family temple." (In King Street.)

梁氏家廟 Leung shi ka miu; "Surname Leung family temple." (In Muntri Street.)

黃氏家塾 Wong shi ka shuk; "Surname Wong family school." (In Penang Street,)

李氏館 Li shi kun; "Surname Li house." (In Love Lane.)

端芬館 Tun fan kun; the Kong-si house of the people of surname Miu. (In Penang Street.)

古城會館 Ku shing ui kun, "The ancient city meeting house"; this is the meeting-house of the people of the following four surnames Lau 劉 Kwan 關 Cheung 張 and Chiu 趙 The words ancient city' bear reference to the story of the "Three Kingdoms," in which four notables of the above surnames respectively adopted each other as brothers. (In King Street.)

五福書院 Ng fuk shu un "the five blessings college"; this is the Kong-si house of the people coming from the following twelve districts of the Quang-tung (Canton) Province, viz., Nam Hoi 南海 Pun-u 潘禺 Tung kun 東莞 Shun tak 順德 Heung shan 香山 San on 新安 Sam shu 三水 Chhung fa 從化 Chang shang 增城 Ung mun 龍門 Chhing un 清遠 Fa un 花縣 (In Chulia street.)

C. TE-CHIU. Name romanized in Te-chiu sound.

韓江家廟 Hang kang kia bio, "Han river family temple"; so called after the name of a river near Swatow in China.

D. KHEH *or* HAKKA. Names romanized in Kheh sound.

嘉應會館 Ka in fi kwon; ka in = ka ying chow, and fi kwon means meeting-house. (In King Street.)

惠州會館 Fi chiu fi kwon; fi chiu = Wai chow. (In Prangin Road.)

增龍館 Chen liung kwon; chen stands for chen shang **增城** and liung stands for liung mun **龍門** (In King street.)

仁勝館 Yin shin kwon. This is an old Kong-si house of the Kheh people. The name is simply a fancy one. (In King Street.)

永大館 Yin thai kwon; yin stands for yin thiu **遠定** and thai stands for thai phu **大埔** (In Toa Aka Lane.)

從清會館 Chhung chhang fi kwon; chhung stands for Chhung fa **從化** and chhiang stands for chhiang yieu **清遠**. (In Prangin Road.)

(e) HAILAM. Names romanized in Hailam sound.

瓊州會館 Keng chiu ui koan; keng chiu = kengchow. It is also called thien ho kiong **天后宮** meaning the Temple of the Queen of Heaven. (In Muntri Street.)

蘭亭閣 Lan teng kok This is merely a fancy name. (In Church Street.)

(f) SHANGHAI *and* NINGPO. Name romanized in Mandarin sound.

三江公所 San chiang kung so, "Three chiang public-house," the three chiangs (also pronounced kiang) being che kiang 浙江 kiang-su 江蘇 and kiang-si 江西 three provinces in North East China.

A LIST OF SOME DISTRICT NAMES IN PENANG.

PART I. In Town.

Bakar Bata: *Hokkien*, Chui" á iô 鏏仔窯 "Brick-kiln."

Dato Kramat: *Hokkien*, Sì khám tiàm 四坎店 "four shops." *Cantonese*, Si kan tin 四間店

Dhobi Ghaut: *Hokkien*, Sé pó· kiô 洗布橋 "washing clothes bridge."

Jalan Bharu; *Hokkien*, Tiong-lō· 中路 "middle road." *Cantonese*, Chung lo 中路

Kampong Bharu: *Hokkien*, Toā chhiū kha 大樹脚 "Big tree foot."

Kebun Limau; *Hokkien*, Kam-á hu^{n} 柑仔園 "Orange plantation." *Cantonese*, Kam chai un 柑仔園

Pulau Tikus; *Hokkien*, Phû lo· ti kut 浮羅池滑

Rifle Range; *Hokkien*, Phah chhèng po 打銃埔 "Firing gun field."

Sepoy Lines: *Hokkien*, Si pai po· 時排埔 si pai = sepoy ; po· = field.

Tarek Ayer; *Hokkien*, Gû chhia chúi 牛車水 "Bullock-cart water." *Cantonese*, Ngau chhe shui 牛車水

Titi Papan; *Hokkien*, Tiaù kiô thaû 吊橋頭 "Suspension bridge head." *Cantonese*, Tiu khiu thau 吊橋頭

Ujong Pasir, or Prangin : Siā boé 社尾 "town end." *Cantonese*, She me 社尾

Part II. Up-country.

Some of the names are romanized in Kheh sound, as the up-country districts are inhabited more by Khehs than Cantonese.

Ayer Itam : *Hokkien*. A yá i tām 亞逸依淡

Ayer Puteh: *Kheh*, Kung si san 公司山 "Kong-si hill."

Bagan Jermal: *Hokkien*, Oân tò 灣斗 "bay."

Balik Pulau: *Hokkien*, Phû lô 浮爐 *Kheh*, San poi 山背 "hill back," i. e., the back of the Pentland Range. The town is called Pho· 坡 by the Hokkiens, and Tanjong by the Khehs. Balik Pulau village is called Kung-si, or Bokkan, which is a corruption of the Malay word "pekan," and the only street there is called fu lo kat chhong 湖爐街塲

Balik Pulau Hill: *Hokkien*, Phaù tai téng 炮臺頂 "Fort top." *Kheh*, Phau thoi tong 炮台頂

Batu Ferringgi: *Hokkien*, Batu téng-gî 峇抵丁宜 *Kheh*, Ma tu tin yi 峇抵丁宜

Batu Itam: *Hokkien* Batu I-tām 峇抵夷淡 *Kheh*, Chin kau lung 進教隴 "Christian place."

Batu Lanchang: *Hokkien*, Batu bān chiang 峇抵閩漳

Batu Uban: *Hokkien*, Batu bān 峇抵閩

Bayan Lepas: *Hokkien*, Mâ lák pâi 嘛吶排

Bukit Penera: Niáⁿ téng 嶺頂 "hill-path top." *Kheh*, Au tang 凹頂 "valley top."

Gelugur; *Kheh*, Liong hang hiau 凉坑口 "cold stream mouth."

Gertak Sanggul: *Hokkien*, Boé ô· 尾湖 "last lake." *Kheh*, Bi fu 尾湖

Ginting: *Hokkien*, Bûn téng 文頂 *Kheh*, Vun ting kok. 文頂 Vun ting is a corruption for "Ginting," and kok means corner.

Jalan Bharu: *Hokkien*, Sin lō·-thaû 新路頭 "new landing place." *Kheh*, Sin tu thiau 新渡頭

Jelutong: *Hokkien*, Jit lòh tōng 日落洞

Pasir Blanda: *Kheh*, Chuk sa wi 竹沙園 "Bamboo sand enclosure."

Pasir Panjang: *Hokkien*, Toā soa po 大沙埔 "Big sand field." *Kheh*, Thai sa pu 大砂埔

Paya Trubong: *Hokkien*, Tò bōng laī 倒蒙內 tò

bōng is a corruption for Trubong, and lāi means inside.

Permatang Pasir: *Hokkien*, Māng-gi kha 望吃脚 "Manggis (mangosteen) foot." *Kheh*, Sa kong 沙崗 "sand hill."

Pondok Upil; *Hokkien*, Ô· pi^{n} 湖邊 *Kheh*, O bi 湖邊

Pulau Betong; *Hokkien*, Phû lô· bit tōng 浮爐蜜洞 *Kheh*, Fu lo mit tong 浮爐蜜洞

Relau: *Hokkien*, Ô· laī 湖內 "lake within" = inside the lake. *Kheh*, (1) Fu lo wang 湖爐橫 (2) Lau kong 舊港 "Old stream."

Relau Hill: *Kheh*, Nga kong chhai 瓦崗寨 "the hill fortress."

Sungei Ara: *Kheh*, Sin kong 新港 "new stream."

Sungei Burong: *Kheh*, Sung kiau vu yiung.

Sungei Kluang: *Hokkien*, Bāng kha lân 望脚蘭 = "Pengkalan" which means "landing place" in Malay.

Sungei Nibong: *Kheh*, Sung kiau li bong.

Sungei Pening: *Kheh*, Sung kiau pin long.

Sungei Pening: *Hokkien* Chiā^{n} chúi káng 淡水港 "Fresh water river."

Sungei Rusa: *Kheh*, Sung kiau liu sa.

Sungei Teeram; *Hokkien*, Koè soa^{n}-á 過山仔 "Over the hill."

Tanjong Bunga: *Hokkien*, Koè soaⁿ 過山 "Over the hill."

Tanjong Tokong: *Hokkien*, Pún thaû kong sū 本頭公嶼 "God's islet." *Kheh*, Hoi tsu tsz 海珠寺 "sea-pearl monastery."

Teluk Bahang: *Hokkien*, Lân chio huiⁿ 蘭椒園 "Pepper plantation."

Teluk Kumbar: *Hokkien*, Kong pá 公巴 *Kheh*, Kum pa.

ISLETS IN THE VICINITY OF PENANG.

Pulau Betong: *Hokkien*, Phû lô· bit tōng 浮爐蜜洞

Pulau Jerijak: (1) *Hokkien*, Phû lô· jî jiak 浮爐兒巷 *Cantonese*, Muk kau shan 木冠山 "earthen-pot hill" = hill of the shape of an earthen pot. (2) *Hokkien*, Thái ko· sū 癩哥嶼 "Lepers' island," called after the Lepers' Hospital there.

Pulau Kra: *Hokkien*, Sū á 嶼仔 "islet."

Pulau Rimau: *Hokkien*, Aó·-á sū 虎仔嶼 "tigers island."

Pulau Tikus: (1) *Hokkien*, Péh sū 白嶼 "white island." (2) *Hokkien*, Phû lô· kiet chí 浮爐結只 Malay "Pulau Kechil" = small island.

A LIST OF NAMES OF SOME PLACES IN PROVINCE WELLESLEY AND DINDINGS.

Province Wellesley: *Hokkien*, Koè káng 過港 "over the harbour."

Ara Kuda: *Hokkien*, À-lah kú-tá 亞剌古打

Ara Rendang: À-lah lang 亞剌郎

Aur Gading: *Hokkien*, Song-kai loa 雙溪賴 Sungai dua.

Bagan Ajam: *Hokkien*, Chiu ông iâ thaû 周王爺頭 "Chiu god head"—the place where the god is whose name is Chiu.

Bagan Dalam: *Kheh*, Fo shui chhong 水火廠 "Kerosine oil tank."

Bagan Lalang: *Hokkien*, Sì-kak huî" 四角園 "square plantation."

Bagan Luar: *Hokkien*, Bāng liaû 網寮 "net-houses" = fishing houses.

Bagan Tuan Kechil: *Hokkien*, Chûn lō·-thaû 船路頭 "vessel landing place."

Bukit Mertajam: *Hokkien*, Toā soa" kha 大山脚 "Big hill foot." *Kheh*, Thai san kiok 大山脚

Bukit Minyak: *Hokkien*, Tām-má (Damar) soa" 淡媽山 "Damar hill." *Kheh*, Pa ma san 把麻山

Bukit Seraya: *Hokkien*, Sin pa 新把 "new forest." *Kheh*, Shin pa 新把

Bukit Tambun: *Hokkien*, Tambun 淡汶 *Kheh*, Tam mun 淡汶

Bukit Tengah: *Hokkien*, Bukit téng-gâ 武吉丁牙 *Kheh*, Vu tsz teng-a 芋子丁芽

Butterworth: *Hokkien*, Pak hái 北海 "north sea."

Cherok Tokun: *Hokkien* Tok-kun tō 督君肚 *Kheh*. Tokun tu 督肚君

Jalan Bharu: *Hokkien*, Sin lō·-thaû 新路頭 "new landing place." *Kheh*, Sin thu thiau 新渡頭

Juru: *Hokkien*, Gī hú 義府 *Kheh*, Ngi fu 義府

Kapala Batas: *Hokkien*, Pa-la ba-tai

Kubang Semang: *Hokkien*, Ko-pa sam-bāng 高巴三夢 *Kheh*, Thai ng tham 大魚潭 "Big fish pond."

Lahar Ikan Mati: *Hokkien*, Ikan mati.

Machang Buboh: *Hokkien*, Pa-siā tō· 巴錫肚 *Kheh*, Ta siak tu 打錫肚

Maklom: (1) *Hokkien*, Sin hûi" 新園 "new plantation." (2) *Hokkien*, Pa-tang (Batang) boé 巴東尾 "Batang end."

Mengkuang: *Hokkien*, Mang kuang. *Kheh*, Mang kang

Nibong Tebal: *Hokkien*, Ko ien 高淵 "Krian." *Kheh*, Kow yen.

Padang Manora: *Hokkien*, Jara.

Pagar Tras: *Hokkien*, "Pa-siā tō· sèng-tîg 巴錫肚聖堂 the holy church at Machang Buboh. *Kheh*, "Ta siak tu" shin thong 打錫肚聖堂

Parit Buntar: *Hokkien*, (1) Sin ba laî 新峇嗹 "new station." (2) Bûn ta 汶礁

Penaga: *Hokkien*, Pún ná gâ 本拿牙

Permatang Bandahari: *Hokkien*, Ba tang hā lí 峇東夏里

Permatang Pasir: *Hokkien*, Batang Pasir; *Kheh*, Matang Pasir.

Permatang Pau *Hokkien*, Batang Po 峇東保 *Kheh*, Matang pu 馬登保

Poko Brangan; *Hokkien*, Lèng chui tiam 冷水店 "cold drink shop." *Kheh*, Liong shui tiam 冷水店

Sempang Ampat; Sin pang àm pat 新邦安拔

Sungei Bakap; *Hokkien*, Jiáu"i 擾夷 "Jawi." *Kheh* Yan yi.

Sungei Derhaka: *Hokkien*, Sungei laka. *Kheh*, Sa kong mui 沙崗尾 "sand hill end."

Sungei Rambai: *Hokkien*, Káng kha 脚港 "river foot." *Kheh*, Kong ha 港下 "river below."

Tasek: *Kheh*, Pa seh.

Tebing Tinggi: *Hokkien*, Soa"-á 山仔 "small hill."

Dindings: *Hokkien*, Kaú sū 九嶼 "nine islands." *Kheh*, Kau chi liu 九子連 "nine links."

Bruas: *Hokkien*, Jit lòh sa 日落沙

Lumut: *Hokkien*, Ang thô· khàm 紅塗磡 "red earth cliff." *Cantonese*, Hung hom 紅磡

Pangkor: *Hokkien*, Pang ko 望閣

INDEX OF THE STREETS.

A kùi ke	Ah Quee Street
À-ɾhièn kong-si ke	King Street
A-iá i-tâm lō·	Ayer Itam Road
A ék tò-lūn	Waterfall Road
Âng mô· lō·	Northam Road or Farquhar Street
Âng mo· kū thióng	Northam Road
Âng mo· ỏh chêng	Farquhar Street
Âng mô· sin thióng	Western Road
Bān an tâi	Kulim Lane
Bān Tek hong lō·	Sungei Ujong
Bang-ka-lí hāng	Argyle Road
Batu Gantong	Scotland Road
Bêng hì tâi	Kulim Lane
Bêng san lō·-thaû	China Street Ghaut
Chảp chhit keng	Chulia Lane
Chảp-jī keng	Queen Street
Chảp keng chhù	Carnarvon Street
Che-tî ke	Penang Street
Chhâ kang ke	Bishop Street
Chhâ lō·-thaû	Chulia Street Ghaut
Chhâ tiâⁿ	Maxwell Road
Chhâ tiâⁿ aū	Tek Soon Street
Chhat bok ke	Bishop Street
Chhaú-po· ɬaí-kiⁿ lō·	Esplanade Road
Chhèng iỏk keng	Magazine
Chiú lông lō·-thaû	Church Street Ghaut
Gī-hin kə	Church Street
Gī-hin-ke lō·-thaû	Church Street Ghaut
Gī-hok ke	Rope Walk
Goā koan	Downing Street

Gō· pha teng	Magazine
Gû chhia ke	Prangin Road
Gû chhia chúi	Burmah Road
Gû kan-tàng	Chulia Street
Haí kiⁿ sin lō·	Weld Quay
Hiang-káng lō·	Hong Kong Street
Hô· chio tiâⁿ	Sungei Ujong
Hô· seng kong-si ke	King Street
Hoan-á hì-huîⁿ ke	Kwala Kangsa Road
Hoan-á thióng	Carnarvon Street
Hoé chhia lō·	Gladstone Road
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Hūi chiu kong-si ke	Prangin Road
Iâ kha	Pitt Street
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Jī ông chhù lō·	Residency Road
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Kièn goân ke	Armenian Street
Kiet-lêng-á bān san	Chowrasta Road or Tamil Stree
Kiet-lêng-á ke	King Street or Chulia Street
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Koan-á kak	R. C. O. Front
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Pā sat ke	Market Street
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Peng pâng lō·	Barrack Road
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Phah phaù ke	Cintra Street
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Phah tâng ke	Armenian Street
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Toān lô·-sin	Beach Street
Toān pa-lî	Green Hall

The Orang Laut of Singapore.

" We tack not now to a Gallang Prow." Kipling.

At the time of the occupation of Singapore by the British, there were living on the island, then densely afforested, one or two races of natives, known as the Orang Kallang and Orang Selitar. The former of these lived on the river of the same name, the latter along the rivers of the Johore Strait. Some accounts of these two tribes was published by Logan in Vol. i. of Logan's Journal in 1847, and illustrated by outlines of heads. The Kallangs were removed by the Tumunggong of Johore from the Kallang river to Pulai River when the island was ceded to Britain. They formerly consisted of 100 families, but in 1847 the small pox had reduced them to eight. They were said to have lived exclusively in boats, neither building huts nor cultivating any plants. Their language at that time appears to have been Malay, and neither Mr. Logan nor Mr. Thomson who described the Orang Selitar were able to elicit any words of their original language. Of these races it is not easy now to find any traces, as they have become amalgamated with the Malays, adopting not only their language but also their customs and religion. Lately however the authors of this note visited Kampong Roko, on the Kalang river, and made an attempt to collect what information was procurable concerning this interesting people. They were accompanied by Mr. R. H. Yapp (of the Cambridge expedition) who took photographs of some of the older men who were stated to be of this race. Kampong Roko itself is a Malay village of the ordinary type, built on a mud bank of the Kalang river and containing a very mixed population. The natives have for many years employed themselves in fishing and in preparing Nipah leaves for cigarettes-wrappers, so that the ground is covered for a considerable depth with a dense mass of waste fragments of leaves. We visited the village on Nov. 12th, and sought out the oldest inhabitants, the Batin Jenang, and an old man named Rabu, together with one or two others, and spent a long time with them in endeavours to

obtain information as to the language, traditions, etc., of the Kalangs, but they seemed to have forgotten most of the language, and but little information could be obtained, though what was obtained was of considerable interest. They affirmed that they were Orang Daik (Malay) from Lingga, and stated that there were at least eight tribes who used to visit this district, and were mostly pirates. They were the

Orang Tambus	Orang Sekanak
Orang Mantang	Orang Barok
Orang Galang	Orang Moro
Orang Pusek (or Persik)	Orang Sugi

The first two always lived in boats, having no fixed habitations, and were not piratical. The rest were all bad pirates, who lived on various islands and travelled as far as Siam and Cochin China on piratical expeditions. In the time of Sultan Mahmud, Raja Lang was the chief of the Galangs, and Orang Kaya Mepar (Che Muntel) was chief of the Baroks, and his grandson is now head. They have a village at Singkep, or as one of the men said, on Lingga. The Persiks now live at Pulau Persik between Retik and Daik. They had a Batin as chief, but no Jenang. The Orang Tambus now live in a village in Silat Durian, among the Riau islands. They had a Batin only. The Orang Mantang lived on Pulau Mantang and were very numerous. They had a Batin. The Orang Galang lived mostly in Pulau Karas, in the Riau Archipelago, and had a Batin only. The Orang Sekanak lived on an island between Pulau Retik and Pulau Daik. The Orang Sugi live near Sulit, in Riau, and had a Batin. The Orang Moro lived in Pulau Moro, near Pulau Sugi; but they were also said to belong to the Orang Daik. It should be noted that among the Sakai tribes of the Peninsula, the Batin is usually if not invariably considered as the superior of the Jenang. Here however at Kampong Roko it was stated quite positively that the Jenang was the higher official.

The following non-Malay words were obtained from these men:

Koyok, a dog. Used by all the above mentioned tribes.
Kiyan, come, come here (lit. thither) cf. Belandas tribe *Chan*.
Kiyun, go away (lit. hither) cf. Belandas *Chun*.

Kiyoh, far off.
Sika, come here, e g., *Sika makan* come here and eat.

The following words are probably all of Malay origin:
Jengkeng or *bidah*, a boat (sampan or koleh).
Lanchang, a sailing vessel.
O-neh or *O-ne*, friend or comrade, used in addressing other members of the tribe whether young or old, e.g., *O-neh Nan Kamana?* Where are you going, friend? The *O* in *Oneh* may be merely interjectional.
Diko = *engkau*, also used in addressing other tribesmen, but less polite or less friendly than *O-ne*.
Pohon was used instead of *Poko*, tree, as on the East Coast and elsewhere.

The pronunciation was said to be peculiar, thus: *s* was pronounced like a soft *z*, e.g., *Nazi* for *Nasi*; *r* like *h*, e.g., *Parang* for *Pahang*; *k* like *kh*, e.g., *Khain* for *Kain*; *Khakhi* for *Kaki*.

Too much stress however must not be laid upon these examples of pronunciation, as although what was heard is faithfully recorded, the personal equation enters too largely into this sort of questions for them to be accepted without repeated checkings. A Sakai, for instance, will occasionally pronounce one and the same word in two distinct ways, probably through nervousness at being questioned by an European.

Slight as these traces are, if taken in conjunction with the important fact that the constitution of these tribes corresponds fairly closely to that of Sakais (as is shown by the Sakai names of the chiefs) they appear to suggest the theory that the Sea-gypsies of Singapore owe their origin largely from Sakai hill-tribes in the Riau-Lingga Archipelago; that these, whether through pressure of the Malay immigration or from other causes, took to the sea, and reinforced probably by more than a sprinkling of mere Malay adventurers, developed into the famous piratical race which under the generic name of Orang Laut became for a space the terror of all who sailed these Eastern seas. Such an evolution of one of the mildest mannered and most timid races of the earth would certainly appear unaccountable, but if it is to be rejected, it involves us in still greater difficulties. The evidences may be briefly enumerated as follows.

(1.) The constitution of the tribe under Jinang and Batin.

(2). The use of undoubted Sakai words; of these *Koyok Kiyan*, and *Kiyun* are all words allied to those used by the Belandas tribe in Selangor.

(3.) The Sakai "terumba" or racial records as preserved by the Besisi tribe in the Kwala Langat district (Selangor), which explicitly state that the ancestors of the original tribe descended to the sea and became sea-folk (*turun kalaut jadi raiat laut*) and that the sea-folk became pirates (*Raiat laut jadi Bajau*).

Further investigations when opportunities occur may supply more extensive information as to these wild tribes, now so nearly vanished. The foregoing notes, incomplete as they are, show that there are still some records worth the attention of any who have the chance of studying the race, and research in the district of Selitar and Pandan, where the tribe, as late as 1847, were in a very primitive state of civilisation, and in the Carimons, and neighbouring islands, may throw more light on the history and relationship of the Orang Laut.

W. W. Skeat.
H. N. Ridley.

Cases of Lightning Discharge.

By G. E. V. Thomas, A.M.I.C.E.

Communicated by H. N. Ridley.

The study of lightning phenomena is of great interest and importance, and as the conditions which obtain in Malaya are extremely favourable for the observation of such phenomena, as regards the frequency and violence of thunder storms, it is somewhat surprising to find that the accounts so far available are few. Those here given are of interest as being descriptive of unusual effects.

In well-marked cases of the destructive effect of lightning on trees, the tree struck is completely shattered. Such instances are familiar, probably because they are immediately apparent as the result of a severe storm; but the gradual decay and death of a number of trees in the vicinity of one struck, which would seem to be a frequent after-effect, is a form of damage which, as far as the writer can ascertain, has not previously been noted.

The following account, from the diary of Mr. H. N. Ridley, Director of Gardens and Forests, S. S., describes such an effect, which occurred in a coco-nut plantation in Singapore.

"May 3rd 1898. Visited Siglap and saw a place where, more than a month previously, a tree was struck by a tremendous flash. From this tree in a semicircle (there being none on the outer side) eleven more trees died. The deaths appeared to radiate out from struck tree gradually. Three were still standing; they bore young fruit and flowers, but the whole of the foliage looked as if burnt. One was still alive and putting up a fresh leaf. One, covered with fungi, had been dead some time. Why this progressive death? Inspector tells me he saw a similar case where, some time after the death of coco-nuts, some mangosteen trees withered away in like manner.

A similar instance recently occurred in the Botanical Gardens, Singapore, and was brought to the writer's notice by the

same observer. In this case two trees (*Erythrina* and *Detarium*) appeared to have been struck simultaneously. Though the damage apparent was very slight and confined to the bark, decay began in the *Erythrina* within ten days. Another *Erythrina* adjoining died soon after, but the *Detarium* was unhurt. Another example occurred on Government Hill, when a sugar palm was struck (May 2nd, 1899). The writer saw the tree two hours afterwards and obtained the following account from a native eye-witness. "About half past one there was a single peal of thunder, very near, but I saw no flash, only a general glare. Less than one minute afterwards smoke came from the tree and then flames, about half way up the trunk. The fire went up very quickly and I ordered the tree to be cut down." When the writer saw the tree, the fibrous material which covers these palms was still smouldering, but the closest examination failed to reveal any traces of damage other than that caused by fire, and the surrounding trees were quite unhurt. Three months afterwards, however, the similar palms in a radius of twelve or fifteen feet from that struck were completely dead.

A remarkable point in this instance is that although the palm struck was over sixty feet in height, and surrounded by others even taller, the flash should have struck it in the middle. Mr. Ridley has noted a similar case in which an explosion took place in the fork of a Rambutan tree only six feet above the ground between the base of the fork and a birds-nest fern, and set fire to the roots of the fern. There was no damage done to this tree except from burns, but a chicken at its base was killed.

The first of the following accounts, furnished by Mr. A. Knight, is of particular interest, as the phenomena noted were of an unusual kind and did not occur during a storm. Mr. Knight writes:—"On the 12th September, 1898, I was driving home from town, and when in the lower part of River Valley Road I saw a flash in front, and there was a loud report which made my pony start forward. On reaching my house, Grassdale, I found that the ladies of my household had been much startled by the explosion. Two of them had been near the entrance, standing facing towards town, while two others were walking from the direction of town and were about a third of a mile from the house. To the former two a flame-coloured flash seemed to fall

in front of them; to the latter two a bright light seemed to be thrown in their faces and the loud report was instantaneous. These two afterwards detected a sulphurous smell, and all felt a sensation like an electric shock. There had been some distant thunder and rain shortly after noon. It had afterwards been bright but stormy looking; and though clouds were gathering in the evening, there was at that time no thunder or lightning. Shortly afterwards there was heavy thunder near, followed by a copious shower. A. K."

Mr. Knight's second account also describes a form of discharge about which very little is known. It is unfortunate that no photograph was obtained, as it would seem from comments in a recent electrical journal that no photograph ever has been obtained of this phenomenon, and it has been customary to discredit statements as to its appearance. Mr. Knight's note differs from the more usual accounts, in which the ball of fire is said to run about before bursting, but is closely analogous to a case quoted by Dr. Oliver Lodge,* in which however the ball is described as of a reddish yellow colour, changing to vivid white. Mr. Knight's account is as follows:—"On the 14th October, 1898, there was a very severe thunder squall—strong wind, violent rain and much thunder, not very distant. It came on suddenly, about 7 p.m., as we were going down to dinner; and as I was about to take my seat at the end of the table, facing the back of the house, I saw an explosion in the air, like that of a fireball or bomb, probably four or five feet above the ground, and there was a loud bang. The light appeared greenish white. There is no doubt that it was in the back garden, as it was located there by some neighbours whose line of sight was at right angles with mine."

Mr. Ridley reports also the two following cases of globular lightning, differing from that of Mr. Knight in that the phenomena occurred outside the storm. "Some few years ago, I was sitting in my verandah, about 7 p.m; it was quite dark, and there was a thunderstorm going on over the Economic Garden. Suddenly there was an intensely brilliant flash and instantaneous explosion close to the house. My back was towards the garden,

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* Lightning Conductors and Lightning Guards. Prof. O. J. Lodge.

so that I only saw the reflection of the light. Mr. Feilding was at the time passing along the road below the hill on which my house stands, when he saw a ball of fire descend in a curve, slowly, about 50 yards from the house, close to the ground, between him and the house. It appeared to explode with a tremendous noise. Careful examination of the grass where the ball fell showed no trace of burning or other mark. Simultaneously with this phenomenon, a large tree (*Irvinia*) in the Economic Garden was struck by lightning, but hardly injured. This stroke was the last flash of the storm."

(2) "A thunderstorm was taking place over the Bukit Timah Road, beyond the Economic Garden, one Sunday about two years ago, at between one and two p.m. The sky was bright, but not cloudless, and the sun brilliant over my house, and I went out on the lawn to look at the distant storm to the North. I saw a zigzag flash apparently about three-quarters of a mile away, and, almost absolutely simultaneously, a peal of thunder came from behind me, and behind the house to the west. I saw nothing to account for this, but Mr. Robertson-Glasgow, who was sitting in a room facing west, saw a luminous body, not ball-shaped, though more or less rounded, moving in a downward curve to the South, till it disappeared behind some trees, and was followed by the thunder. It was less bright than the sunlight."

The only local cases of damage to buildings reported are those at the Cape Rachado and Muka Head Lighthouses. The writer was fortunately able to inspect the former not long after the occurrence, and found it to be an interesting example of side flash, a discharge having left the very fine "Lightning Rod Conference" copper conductor at a bend and made sundry holes in solid masonry walls, traversing two rooms and finally being dissipated over the sheet of rain water collected in a courtyard. The Lightkeeper's report shows that in this case the "expenditure of observers" deprecated by Dr. Lodge, nearly occurred, as the matting under two low wooden beds, on which some of the lighthouse attendants were lying at the time, was torn to pieces. The report concludes:—"In that time Serang, Tindal and two Lascars is inside the room grate of the Almighty pity there had not been anything happen."

The Muka Head case (October 9th, 1897,) affords another example of the inefficacy of the old-fashioned single conductor, which was supposed to protect a building of any size if only it were high enough, and had nicely sharpened points and an earth resistance measuring a fraction of an ohm. From the interesting report by Mr. Wills,* the Lighthouse keeper, it would seem that a flash struck the conductor, leaving evidence by tearing off a gunmetal brace about half way up. The discharge then left the heavy copper rod and proceeded to earth by a thin telephone earth wire, thirty feet of which was completely deflagrated. From some further reports collected by the writer, it would seem that Penang Hill would form an excellent site for observation, as the disturbances noted by the Signal Sergeant stationed there are exceptionally freakful and violent. He states that in April, 1898, a telegraph pole was cut in half horizontally as if it were sawed off." The telegraph wire was also cut in three or four places and three insulators broken. On another occasion, a discharge passed through a large earthenware jar, making one hole of several inches in diameter, and a second of less than one inch, and finally excavating part of the floor near the jar.

An attempt to explain the conditions which serve to bring about results like these is not within the scope of the present notes, but the writer may, perhaps, be permitted to invite further lightning notes, accompanied where possible by photographs. Such records are of the greatest possible assistance in promoting the general knowledge of a series of phenomena about which there is still much to be discovered.

G. E. V. Thomas.

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*Kindly furnished by Mr. O. V. Thomas, Acting J. Supt. Govt. Telegraphs, Penang.

Notes from the Sarawak Museum.

On a Remarkable Dipterous Larva.

During a recent visit to Mt. Penrissen, Sarawak, I found in sand beneath some overhanging cliffs numerous small pit-falls exactly like those made by the ant-lion; some of these when examined were found to contain a curious worm-like larva which has since proved to belong to a fly of the genus *Vermileo*, family *Leptidæ*. The body consists of 11 segments, into the first of which the head can be completely retracted, five annuli can plainly be distinguished on segments 2, 3, and 4, but are less well marked on the others; the 10th consists only of three. The middle annulus of the fourth segment bears on the ventral surface a fleshy knob (abdominal pseudopod) which is surmounted by a small semicircular chitinous comb longitudinally placed; the eighthsegment ventrally bears a median tuft of setæ, and a fringe of similar setæ marks the posterior border of the 9th segment, this also carries on its ventral surface 2 median setigerous papillæ. The 10th segment, which is set at somewhat of an angle to the 9th, bears on the dorsal surface at its anterior border a fringe of very strong setæ directed backwards. The 11th and last segment terminates in four finger-like processes clothed with delicate hairs, the anus opens on its ventral, two stigmata on its dorsal surface. The last three segments are markedly larger than any of the preceding ones. The larva burrows into the sand head first, until completely buried, and then proceeds to form its pit-fall in the following manner: the more deeply buried tail-end acting as a fixed point, the anterior half of the body is curved about in all directions, each curving motion being followed by a rapid straightening out, which jerks the sand away for some little distance; since the tail is fixed, the result of many of these motions is to produce a circular repression with sloping sides; at the bottom of this lies the larva, ventral surface uppermost, the posterior half of the body still buried, the anterior half exposed and straightened out. If now an ant is introduced into the pit-fall, the exposed part of the larva suddenly curls up in a spiral coil, the prey being generally included

in the coil and impaled by pressure on the chitinous comb of the 4th segment; a hold is then gained with the mouth, and after a few minutes, with a rapid sinuous motion, the larva straightens out and disappears below the sand, carrying its prey with it. If the larva is not successful in catching its prey the first time, it flings sand about in all directions by rapid switching movements, and the victim, unable to obtain a foothold on the sliding sides of the pit-fall, falls down to the bottom; or occasionally the larva actually strikes like a snake at the victim as it endeavours to escape from the toils, indeed many of the actions of this larva are quite snake-like, and an ant enclosed in one of its coils reminds one of nothing so much as of a small mammal in the grasp of a python. Occasionally the prey seems somewhat out of proportion to the larva, but by means of the numerous setæ on the large posterior segments a very firm grip is obtained in the sand, and I have never yet seen an insect of moderate size make good his escape after having been once seized. I brought down to Kuching alive several of these larvæ, and one or two pupated; shortly before pupation, the larva leaves its pit-fall and lies close to the surface of the sand, though completely covered; the anterior segments become much swollen and retracted, until the integument bursts, revealing beneath the brownish pupa; by some convulsive movements the whole pupa now appears at the surface, the larval skin being slowly shuffled off backwards, but never becoming entirely freed, so that the posterior end of the pupa always presents a somewhat ragged appearance. Unfortunately the heat of Kuching proved too much for these pupæ, and none came to maturity, but shrivelled up; some Leptid flies which I obtained on Penrissen are, however, I am sure, the adult stage.

On a male specimen of Purlisa Gigantеus Dist.

A specimen of this handsome Lycænid butterfly was described and figured by Distant in his Rhopalocera Malayana (p. 250. Tab. XXI. fig. 28. 1885), but the sex was not stated either in this or in two previous descriptions (Distant, Ent. Month. Mag. Vol. XVII. p. 245, 1881, and Waterhouse, Aid. Vol. I. pl. XLVI, 1882), and de Nicéville in his "Butterflies of India," Vol. iii. p.

385, writes :—" I have not seen this species. The sex of the specimens described is not stated, and it would be hazardous even to guess from the figures and descriptions what sex they may be."

With the capture of an undoubted male specimen on Mt. Matang, Sarawak, at an elevation of 3,500 feet, in March of last year, I am enabled to state with absolute certainty that Distant described a female, and as the male sex has never been described I now append a short account of it.

Upperside; forewing as in the female, hind-wing with the dark fuscous area much smaller, commencing as a narrow band at the external angle it rapidly narrows to a thin marginal line; costal area grey; underside rather paler than in the female. The inner margin of the hind-wing just interior to the sub-median nervure is shortly folded opposite the abdomen, the fold containing numerous long scent-hairs. This sexual character though common enough in the Nymphalidæ and Papilionidæ, is only met with, amongst the Oriental Lycænidæ, in the genus Simiskina. The neuration of both sexes is identical. Mr. H. H. Druce has already recorded this species from Borneo in a paper on the Lycænidæ of the island (P. Z. S., 1895, p. 602), but his specimen was a female.

On the female of Dodona Elvira Staud.

The male of *Dodona Elvira* was described by Staudinger in "Iris," Vol. IX. p. 239, pl. V, fig. 6, (1896), together with many other new Bornean species. Females of this species are extremely rare, for though I have caught over one hundred males, I have only been able to secure one female; as that sex has never been described, I do so willingly here :—Larger than male. Upperside ochreous; forewing with base broadly shaded with fuscous, a black spot or costal margin continuous with a fuscous discal fascia, a short line of the same colour, closing the cell and almost fused with the discal fascia. Another black spot on the costal margin, continuous with a very pale fuscous fascia, apex and external margin broadly bordered with black. The border containing some obsolescent, ochreous, submarginal spots. Hind-wing as in the male. Underside ground-colour more rufous

The fascias are white, tinged with ochreous, instead of silvery, and fascia No. 4 on the forewing is very broad, fusing with the white litura which in the male occurs at the base of the second median interspace. Expanse 48 mm. Matang, 3,000 feet. June 1897.

On the System of Cataloguing Adopted in the Sarawak Museum

In the year 1874 an American, Mr. Melvill Dewey, invented and published a system for classifying and cataloguing scientific and other literature by means of employing decimal numbers, this system is known as the Dewey Decimal System. Curiously enough it has received but a small amount of attention in England and her dependencies, a most astonishing fact when one compares its perfect method and simplicity with the systems now in vogue in the majority of large home and colonial libraries. Mr. Dewey is in short the Bertillon of scientific cataloguing, less fortunate than his distinguished prototype, inasmuch as he has still to receive a wide-spread recognition.

The system consists of dividing the subjects, on which literature has been produced, into groups; to each group a number is assigned: each group is subdivided and each subdivision is characterised by a decimal number, following the group number. Thus, under such a number as 600 would be found all works dealing with Geography; a subdivision of this, Europe, would have the number 600.1; Asia, 600.2, etc. The countries making up these main divisions would again have a number—England 600.11, Scotland 600.12, Ireland 600.13, etc., etc., whilst still greater subdivision can be provided for by the addition of another decimal, thus:—Bedfordshire 600.11.1. Naturally enough countless modifications of this system have been suggested and tried.

On contemplating the somewhat chaotic system, or rather, lack of system, employed in cataloguing the zoological specimens in the Sarawak Museum, it seemed to me advisable to re-catalogue the collections by means of a modification of the Dewey Decimal System. Each class of animals was marked with a letter :—Mammals, A. Birds, B. Reptiles, C. Amphibia, D. Fishes, E. Each family of these classes was numbered in order

1, 2, 3, etc., each genus with a decimal number following the family number, each species with another decimal number following that of the genus. Let me illustrate this with an example taken from the catalogue of Fishes.

Class Pisces = E
Order 1. Plagiostomata
Sub-order. Selachoidei
Fam. Carchariidæ = E 1
Genus Carcharias = E 1.1
Species laticaudus = E 1.1.1
with specimens a. b. c. d.
Species acutus = E 1.1.2.
with specimens a. b. c. d., etc.
Fam. Lamnidæ = E 2
Genus Lamna = E 2.1.
and so on.

By this means all necessity of check lists, registers and double entries is obviated; a glance at the catalogue reveals the number of specimens of any given species in the collection, the number of duplicates (if any), the desiderata, the number of species in a genus, of genera in a family, whilst the labels of the individual specimens with numbers corresponding to the catalogue numbers are equally eloquent.

In cataloguing zoological or botanical specimens by this decimal system, one meets with a difficulty which does not occur in cataloguing literature, since literature can be grouped under subject-headings which always remain constant, such as Geography, Geology, Meteorology, etc.; but every biologist knows that new species, new genera, even new families are constantly being created by the systematist, either from newly discovered forms or by the splitting up of old assemblages (for example the Eastern members of the genus *Sciurus* have been recently divided by Mr. Oldfield Thomas into five genera), all of which necessitates the interpolation of new catalogue numbers into the pre-existing series, and I must confess that, as yet, I have been unable to evolve a perfectly satisfactory means of coping with this difficulty. New species may generally be readily disposed of by being added on to those already catalogued, but new genera can not be so treated, since, by so doing, they may be separated

from their nearest allies; and the same holds good when treating with new families. It is, of course, necessary when writing the catalogue, to enter and number in order every species, genus and family already recorded from the area in which the collections are made, whether or no the collection undergoing cataloguing contains all those species and genera; if this is done, a double advantage is secured—the dreaded interpolation is only needed when new species or genera are discovered, and the catalogue becomes a complete faunistic list of the collected-over area, and the importance of such faunistic list is well-recognised by every museum curator. My own method of interpolating new genera into a previously catalogued series has been as follows:—The new genus is numbered with a fractional number, the numerator of such a fraction being the number of the nearest ally of the new genus. The denominator the last two figures of the year in which the new genus was described. For example, let us imagine that a new genus closely allied to *Hestia* was discovered this year. The number of genus *Hestia* in the Sarawak Museum catalogue of Lepidoptera is He 1.1. The new genus would consequently be numbered He $\frac{1}{9}\frac{1}{9}$: the number is cumbersome and somewhat destroys the symmetry of the series, but it is significant, and that feature I have endeavoured to hold constantly in view during my re-cataloguing labours.

R. H. Shelford.

The Hot Springs of Ulu Jelai.

By A. D. Machado.

Having recently occasion to visit the extreme Ulu of the Jelai district, Pahang, in connection with certain prospecting operations which I was then undertaking for the Malayan (Pahang) Exploration Co., I heard from Sakai aborigines of the existence of hot springs in this neighbourhood. These springs I found to be situated on one of the spurs of the main range of hills dividing Pahang from Perak, about Latitude 4° 20′ N., and Longitude 101° 30′ E. Our Sakai guide, who visited this spot ten or more years ago, described the phenomenon as one eruptive fountain of hot water and steam—the water, according to him, ascending to a considerable height, a true Geyser in fact. I saw quite a different thing. I found seven non-eruptive springs of hot water and steam, the former flowing over sloping terraces or basins of granitic boulders, till finally they joined on to a stream called the Chá-âng, which in turn drained into the Jelai. If the statement of the Sakai is credible, and I have no reason to disbelieve him, there has evidently been a change in the structure of these springs, within the short space of ten years, a very short geological epoch indeed. The usual characteristic sulphurous odour pervaded this place; those curiously fretted rims of the boulders over which the water flowed, due doubtless to the deposition of Silica, sulphur, etc., are also noticeable here. Wild animals, elephants, rhinoceri, deer, etc., visit this spot periodically, judging by their old and fresh tracks, probably for their saline properties, while the Sakais hold this place in great awe and veneration. They seemed quite unable to account for this phenomenon, all the explanation they could give being that they thought it was the work of "hantus." These springs are, in their geological formation, similar to those visited by me in Maliwun, Lower Burma, in Renong, Siamese Malaya, and in other parts of the Malay Peninsula; though, in point of size and importance,

they approximate those of Ojigoku in the Hakone district of Japan.

I feel here tempted to say a word in regard to this little-known district of Ulu Jelai. Doubtless for services rendered, the whole of this district has been assigned, or rather alienated by the Pahang Government to the Datoh Maharaja Puba of Jelai, otherwise and better known as the Toh Raja Jelai, who alone has the right to exploit it. With the exception of a dozen Malays, dependents of Toh Raja, who live at a place called Kwala Betok, the furthest Malay outpost up the Jelai, this district is inhabited exclusively by Sakais. These Sakais plant hill paddy for the Toh Raja and tapioca root for themselves, and do in consequence much unnecessary destruction to valuable timber forests. The ten or a dozen Malays at Kwala Betok have established a kind of an octroi or tithes station, where they exact from the Sakai their pound of flesh for the privilege of cultivating Toh Raja's land, though, to do the Sakais justice, they try by all kinds of subterfuge to evade the payment of these dues—a case of "diamond cut diamond." These Malays will tell you that the Sakais are cunning, unreliable and great cheats; while the Sakais, on the other hand, will tell you that the Malays are hard task-masters, are cruel and merciless—a case again of the "pot calling the kettle black." Taken all in all, this district is fairly rich in economic and mineral products. Rattans are plentiful, and so is Kayu Gaharu (*Aquilaria Malaccensis*) in a lesser degree, while Gutta of almost every description abounds, Gutta Rambong (*Ficus Elastica*) growing wild in places. Of minerals, gold is known to exist; indeed, I have only just located two lodes, which I have my reasons to hope may eventually pay to work. On the Betok, a stream which takes its rise in Ulu Lipis. and which drains into the Jelai at the aforesaid Kwala Betok, having an equal volume of water with the latter stream, tin ore is extremely plentiful and easy to work; so much so, that there is reason to believe that before long a very thriving mining centre will spring up in this corner of the Jelai. The Jelai River, in its upper reaches, abounds in gorges and rapids, formidable obstructions to navigation, thus nullifying its utility as a highway. To those who are venturesome, a descent in bamboo rafts affords exciting experiences.

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